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Engage and Treat and Test and Treat Strategies to Improve Mass Drug Administration for Lymphatic Filariasis: Insights from Healthcare Workers, Community Drug Distributors, and Community Members in the Ellembelle District of Ghana

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ABSTRACT

Introduction: Lymphatic filariasis (LF) is one of the neglected tropical diseases (NTDs) targeted for elimination by the World Health Organization (WHO) as a public health concern. Mass drug administration is a universally accepted strategy for the prevention of LF. The study evaluated ("Engage and Treat" (E&T) and "Test and Treat" (T&T) strategies) the process of providing treatment to community members who missed treatment during the initial Mass Drug Administration (MDA) for lymphatic filariasis in the Ellembelle District of Ghana. It aimed at understanding the effectiveness and challenges of delivering treatment to defaulters through follow-up interventions.

Method: Using a mixed-methods approach, we conducted semi-structured interviews with 12 healthcare workers, 11 community drug distributors, and 100 community members. The methodology allowed for a comprehensive exploration of experiences related to treating those who missed MDA. Thematic analysis was performed using the 2020 version of the MAXQDA software.

Result: Data analysis revealed the effectiveness of Engage & Treat and Test & Treat in improving treatment acceptance, addressing misconceptions, and building community trust. Key findings include the role of testing in alleviating treatment fears, the importance of personalized engagement in increasing uptake, and the critical influence of community leaders and health worker training on Mass Drug Administration success. Challenges such as logistical constraints and mistrust highlight the need for targeted strategies. Testing for Lymphatic Filariasis before offering the drugs has influenced the decision to take the drug, regardless of infection status. Education and community involvement emerged as key elements in breaking lymphatic filariasis transmission.

Discussion: These findings underscore the importance of clear communication and correcting misunderstandings about Mass Drug Administration. The value of strategic tools for communication to persuade hesitant individuals in addition to testing before treating, regardless of infection status, has empowered health workers to undertake effective community engagement to enhance Mass Drug Administration acceptance among defaulters. This study underscores the necessity for continual evaluation and adaptation of innovative ways of delivering Mass Drug Administration.

Keywords: Mass Drug Administration, Lymphatic Filariasis, Community Engagement

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Introduction

Lymphatic filariasis (LF) is a neglected tropical disease that poses a significant global health challenge, affecting millions of people in endemic areas. Caused primarily by the parasitic nematode *Wuchereria bancrofti*, LF can lead to severe and debilitating conditions such as lymphedema and hydrocele, resulting in social stigma and economic hardship for affected individuals [1].

In response to the global health threat of LF, the World Health Organization (WHO) established the Global Programme to Eliminate Lymphatic Filariasis (GPELF) in 2000. The program's primary strategy involves mass drug administration (MDA) of anti-filarial drugs to endemic populations, aiming to interrupt disease transmission and the provision of morbidity management and disability prevention services for affected individuals [2]. While significant progress has been made, with over 9.7 billion treatments delivered to more than 943 million people by 2023, challenges persist in achieving optimal coverage and treating all eligible individuals [3].

Ghana, endemic for LF in 98 out of 216 districts, has implemented MDA programs since 2000. Despite making considerable progress, 7 endemic districts continue to face transmission challenges after over a decade of MDA implementation [4]. Key issues include the inability to achieve optimal treatment coverage, inaccurate reported data, and socio-cultural barriers affecting MDA acceptance.

A critical concern is the presence of non-treated individuals who may serve as reservoirs of infection, potentially undermining elimination efforts. These non-treated individuals fall into two main categories: "refusals" (those who decline treatment due to various reasons) and "not-reached" individuals who miss treatment due to logistical or personal circumstances [5].

Current MDA strategies are limited in effectively targeting these non-treated individuals. To address this gap, innovative approaches are needed to improve coverage and accelerate progress towards LF elimination. This study explores two of such approaches: Engage and Treat (E&T) and Test and Treat (T&T).

The E&T strategy aims to reach and treat individuals who missed MDA for various reasons, while the T&T approach focuses on testing and treating those who refused MDA or feared adverse effects [6]. By evaluating these strategies in the Ellembele District of Ghana, this research seeks to provide insights into improving MDA coverage, enhancing community engagement, and ultimately accelerating progress toward LF elimination.

Methods

Study Site

The study was conducted in the Ellembele District, one of 14 Metropolitan, Municipal and District Assemblies in the Western Region of Ghana. The district, with a population of 120,893 (2021 census), is predominantly rural (72%) and has a history of LF endemicity, with 16 rounds of MDA reported as of 2021. Ellembele District is situated between longitudes 2°05' W and 2°35' W and latitudes 4°40' N and 5°20' N, covering a total area of 1,468 square kilometers.

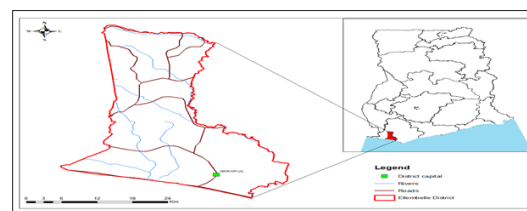


Figure 1: Map of the Study District

Study Design and Data Collection

This study employed a mixed method approach using Semi-structured interview guides developed for each participant group, focusing on their specific roles and experiences with the E&T and T&T strategies, to evaluate the process of providing treatment to community members who missed the initial MDA for lymphatic filariasis in the Ellembele District of Ghana. The research design allowed for a comprehensive exploration of experiences related to treating those who missed MDA, as well as assessing the effectiveness and challenges of the E&T and T&T strategies. A total of 12 health workers, 11 community drug distributors (CDDs), and 100 community members were interviewed using semi-structured interview guides to gather detailed information about their experiences, perceptions, and suggestions regarding the T&T strategies. Participants were sampled for this study using a purposive sampling technique. The in-depth interviews were digitally recorded, with additional notes taken. All recordings were transcribed and those done in the local language translated for analysis.

Data Analysis

Quantitative data including participants' sex, age, participants' status (community member, community drug administrator, or health worker), occupation, and name of community was exported into Microsoft Excel to be cleaned. Stata version 17 was used to analyze participants' background information whereas Excel was used to produce graphs and charts. Thematic content analysis was performed using MAXQDA 2020 software. The analysis process involved familiarization with the data through multiple readings of transcripts, generation of initial codes, searching for themes, reviewing and refining themes, defining and naming themes, and producing the final analysis and report. The qualitative data was coded by two independent coders to ensure reliability. Any discrepancies were discussed and resolved by the two coders to reach a consensus. The analysis was done by the lead author (NAL) and validated by CSA.

Ethical Considerations

The study received ethical approval (CPN 021/19-20) from the Institutional Review Board of the Noguchi Memorial Institute for Medical Research. Informed consent was obtained from all participants prior to their involvement in the study. Confidentiality and anonymity of participants were maintained throughout the research process.

Results

Participant Demographics

The demographic data reveals a significant gender imbalance, with females comprising 68.29% of the population and males 31.71% (Figure 2). Regarding participant status, the vast majority (81.30%) are classified as Community Members (CM),

while 9.76% are Disease Control Officers/Nurses and 8.94% are CDDs (Figure 3).

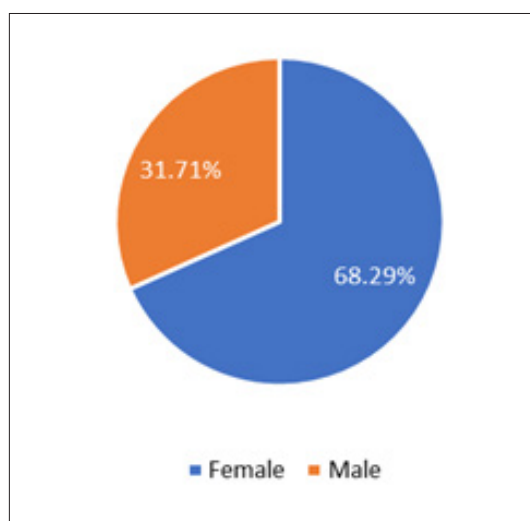


Figure 2: Sex distribution of participants

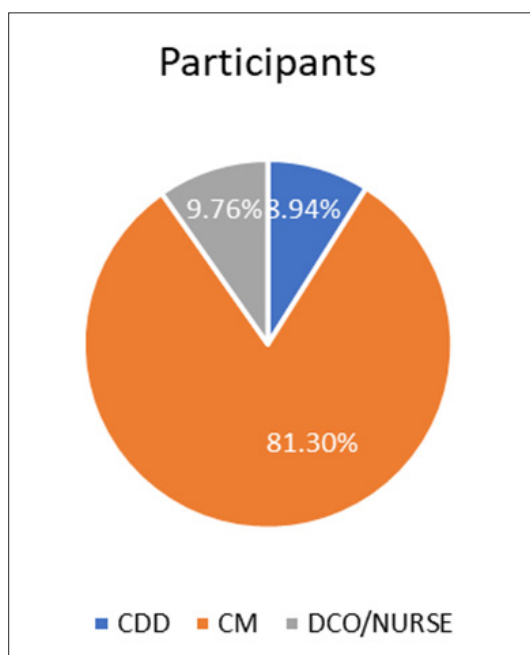


Figure 3: Distribution of Participants

The participants were selected proportionally from 13 communities across the district. Occupationally, the population was diverse: traders/petty traders formed the largest group at 30.89%, followed by farmers/fishermen at 19.51%. Formal employment in the public sector accounts for 14.63%, while 13.82% were unemployed. Students constituted 12.20% of the population, and artisans were 8.13%. Interestingly, only 0.81% were formally employed in the private sector, indicating a predominantly public or informal economy-based workforce.

Awareness and Knowledge of MDA

Community members demonstrated varying levels of awareness about the MDA program targeting lymphatic filariasis elimination. While some participants had a good understanding of the disease and the importance of MDA, others had gaps in their knowledge about the program.

The primary goal behind the Mass Drug Administration (MDA) is to eliminate or eradicate elephantiasis and other related diseases. It's a yearly something, so you have to take it once they come to you. [IDI013, 30-year-old female community member].

I know it prevents us from the disease that causes our legs to be big. [IDI074, 40-year-old male community member].

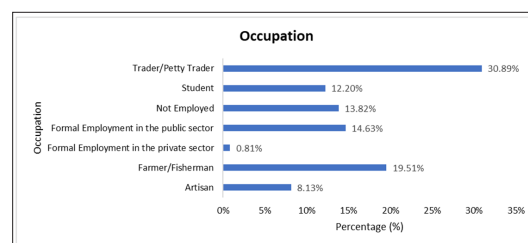


Figure 4: Occupation of participants

Perception of the MDA Process

Participants who missed the initial MDA but were reached through the targeted approach of E&T and T&T generally appreciated the efforts to include them. The process was seen positively, though initial reluctance was noted.

What I can say is that the drug is good. And that you shouldn't give up because the drug is good. The process of targeting those who missed the MDA and offering them the drugs for treatment is also great. [IDI016, 29-year-old male community member].

Impact of Testing on Participation

Testing was a significant factor in convincing non-respondents to accept treatment. Immediate test results helped alleviate doubts and concerns, leading to higher acceptance of the MDA drugs. They were happy that we conducted the tests. Some of them thought that we couldn't test for the disease and get immediate results. However, when they saw us testing others, they realized the importance of participating. [IDI013, 23-year-old male community drug distributor].

Reasons for Receiving Treatment

Participants provided various reasons for accepting treatment during the targeted MDA approach. These included fear of the disease, positive testimonials from others, perceived benefits of the drugs, and trust in the program.

Because I have seen people with elephantiasis, and I don't want to get it. [IDI020, 36-year-old female community member].

When the volunteer came, he said that the disease is a very deadly one and it can make your legs swell. It can deform you [...] That is why I took the drugs. [IDI016, 36-year-old male community member].

Perception of Drug Efficacy

Community members' perceptions of the efficacy of the MDA drugs varied. While many reported positive health outcomes and expressed gratitude, some raised concerns about potential side effects.

After I took the drugs, I can see that I have good health, but I do not know what the drug really does. [IDI103, 31-year-old female community member].

What I can say is thank you very much, because without the MDA drugs, I wouldn't have known what would have happened to me because I was really suffering from my leg. I may have been hospitalized, but because of the drug you give me, I'm good. Thank you very much. [IDI,11,28 Years old female community member].

Some people think that when you take the MDA drugs, they would rather develop sickness. [IDI084, 43-year-old female community member].

Reasons for Missing MDAs

MDA is a critical public health intervention designed to control and eliminate neglected tropical diseases. However, despite significant efforts to ensure community-wide participation, some individuals missed receiving the prescribed drugs during MDA campaigns. The diverse reasons for missing MDAs—ranging from absence, health issues, and lack of information to accessibility, mistrust, and negative experiences—highlight the need for targeted strategies that address these specific challenges to improve future MDA participation.

Despite efforts to reach every community member during MDA campaigns, some individuals miss the opportunity to receive the MDA drugs.

A common reason for missing the MDA was the absence of individuals from the community during the distribution period. Many reported being away for schooling, work, business, or visiting relatives. For example, one community member stated, I was not around; I was in school by then. [IDI, 03, 20-year-old male].

Others mentioned traveling during the campaign, with one participant noting, I was not here when it took place. I traveled. [IDI, 06, 70-year-old female].

Health-related issues also prevented participation. Some individuals were ill during the MDA period, while others were either pregnant or recovering from childbirth. One respondent explained, I was pregnant. [IDI, 04, 28-year-old female], while another noted, I had delivered. They said you could take after giving birth [IDI, 07, 32-year-old female].

Lack of awareness and inadequate communication were also significant barriers. Some community members expressed that they were unaware of the MDA campaign or did not receive information about the dates and distribution points. One participant remarked, I wasn't aware that the government conducted any MDA [IDI, 06, 47-year-old male]. Another added, I am sure that the community drug distributor came and didn't meet me, or I was unaware that the distribution is going on [IDI, 07, 60-year-old male].

Accessibility issues, particularly for individuals living in remote or distant villages, further complicated participation. Some respondents shared that drug distributors did not reach their

areas, as one community member expressed, the community is big and some of us are in very remote villages [...] he never came back until recently [IDI, 03, 72-year-old female].

There were also instances where participants mentioned that the drugs ran out before they could receive their share. One woman shared, When they came the last time, I wasn't home [...] When I got back, the drugs had been shared already [IDI, 18, 56-year-old female].

Concerns about potential side effects and mistrust of the medication were additional factors influencing non-participation. Cultural and religious beliefs, as well as misinformation, led some individuals to refuse the drugs. One participant explained, I have been collecting the medicine from the CDD, but I don't take it because I don't know what kind of bacteria the drug is going to fight in me" [IDI, 12, 27-year-old male].

Others recounted previous negative experiences, such as, the first time I took it, it was good, but I fell sick the subsequent ones [IDI, 02, 22-year-old female].

Effectiveness of E&T and T&T Approaches

The personalized approach of E&T and T&T was well-received. Community members appreciated the direct engagement and home visits, which helped build trust and improve acceptance.

The E&T and T&T approaches have proven to be effective strategies in increasing community participation and acceptance of MDA programs. These approaches focus on personalized engagement through direct interactions and home visits, which have helped address common barriers such as mistrust, fear of side effects, and lack of information.

Building Trust Through Personalized Engagement

One of the most significant impacts of the E&T and T&T strategies is their ability to build trust between healthcare workers and community members. By visiting individuals in their homes, healthcare workers and community drug distributors (CDDs) were able to foster a sense of care and connection, which positively influenced the acceptance of treatment. A community member noted: It's different when they come to your house and talk to you. You feel they care about your health, not just giving you medicine. [IDI, 30-year-old female community member].

Improving Knowledge and Addressing Misconceptions

The E&T and T&T approaches also effectively addressed misinformation and misconceptions about the MDA drugs. Community members reported that having healthcare workers explain the benefits and process of the treatment in a familiar setting was crucial for their understanding and acceptance. A healthcare worker emphasized, when we visit them in their homes, they feel more comfortable to ask questions and express their fears. This way, we can directly address their concerns and reassure them about the safety and importance of the medication" [IDI, 32-year-old male community health nurse].

This direct communication helped demystify the drugs, allay fears, and increase participation.

Encouraging Community Involvement and Building Rapport

Furthermore, the E&T and T&T strategies facilitated a deeper connection between the community and healthcare workers. By engaging local leaders and familiar faces, the initiatives strengthened community bonds, making the healthcare workers' efforts more credible and impactful. One community health nurse remarked: I think they open up when they see familiar faces because I am the nurse here, they know me so they received it well. [IDI, 32-year-old male community health nurse].

Increasing Treatment Uptake and Coverage

The impact of the E&T and T&T approaches on treatment uptake was significant. Many participants who initially resisted or missed the MDA later accepted treatment through these targeted efforts. A community drug distributor shared, some of them were happy that we made the effort to reach out to them. Others were initially present during the main MDA but refused to take the drugs. However, with your approach, they eventually accepted it [IDI, 23-year-old male community drug distributor].

Positive Outcomes and Higher Coverage Rates

The repeated implementation of E&T and T&T strategies led to higher coverage rates and positive health outcomes within communities. Community members who previously hesitated due to fears or misconceptions about side effects were more willing to participate after seeing positive results in their neighbors or family members.

When we came back again, more people were willing to take the drugs because they saw others who had taken it and were fine [IDI, 23-year-old male community drug distributor].

This quote shows how repeated efforts and community observation reinforced the effectiveness of the approaches.

Value of Repeated Efforts

Repeated visits to the homes of noncompliant to offer the E&T and T&T strategies had a positive impact on MDA acceptance. Continuous engagement helped in building long-term trust, which led to compliance as represented in the quote from a nurse below.

Initially people were hesitant, but with repeated visits, they started to accept the treatment. [IDI019, 32-year-old male community health nurse].

Challenges and Concerns

Despite the effectiveness of the E&T and T&T strategies, several challenges and concerns emerged from the community during the MDA campaigns. These challenges highlight logistical barriers, fears about side effects, and issues of misinformation, all of which impacted participation and acceptance.

Logistical and Accessibility Challenges

One of the most significant challenges encountered was the accessibility of MDA services, particularly for individuals living in remote areas. The distribution points for MDA were sometimes too far for community members to reach, making it difficult for them to participate in the program. A community

member shared, the community is big and some of us are in very remote villages. When I asked the CDD about the drugs, he said that it has finished and that new ones would come. But he never came back until recently [IDI, 72-year-old female community member].

This quote underscores the geographical and logistical obstacles that prevent full MDA coverage, particularly in larger or more dispersed communities.

Lack of Awareness and Miscommunication

Lack of awareness and miscommunication about the timing and locations of MDA campaigns were also cited as challenges. Several community members reported not being informed or receiving adequate notice about the campaign, leading to missed opportunities for drug administration. One respondent expressed, I wasn't aware that the government conducted any MDA [IDI, 47-year-old male community member].

Another added, I am sure that the community drug distributor came and didn't meet me, or I was unaware that the distribution is going on" [IDI, 60-year-old male community member].

These statements reveal the need for improved communication strategies to ensure that all community members are properly informed about MDA activities.

Fear of Side Effects and Misinformation

Fear of side effects was another major concern that hindered participation in the MDA. Some individuals were reluctant to take the medication due to past experiences or rumors about adverse reactions. A community health nurse noted, some refuse due to rumors, and others fear side effects of the drugs [IDI, 32-year-old male community health nurse].

This fear was echoed by a participant who shared, the first time I took it, it was good, but I fell sick the subsequent ones; I fall sick immediately I take it before I get well later on [IDI, 22-year-old female community member].

Such experiences and beliefs significantly influenced decisions, with some community members avoiding the MDA altogether.

Cultural Barriers

Cultural beliefs also played a role in some individuals' reluctance to accept the MDA drugs. A few respondents expressed distrust in the medication based on religious or cultural grounds, which were further fueled by misinformation. One participant explained, I have been collecting the medicine from the CDD, but I don't take it because I don't know what kind of bacteria the drug is going to fight in me. There are some drugs with side effects, I was working in a hospital and I have seen what the side effects of drugs can be like [IDI, 27-year-old male community member].

This sentiment illustrates the depth of suspicion and skepticism surrounding the MDA drugs, exacerbated by cultural beliefs and past observations of adverse drug reactions.

Insufficient Drug Supply and Timing Issues

In addition to accessibility challenges, some participants reported that the drug supply was insufficient or that they were

unable to receive their dose due to the timing of the campaign. For example, one community member noted, when they came the last time, I wasn't home. I was sent, and I spent about a week there. When I got back, the drugs had been shared already [IDI, 56-year-old female community member].

These timing issues further complicated efforts to ensure full community coverage and highlighted the need for more flexible and consistent distribution mechanisms.

Community Involvement and Continuous Education

Suggestions for enhancing community involvement and providing continuous education emerged as valuable strategies for improving future MDA programs.

Engaging community leaders more actively can help in convincing people to participate in MDA. They trust their local leaders. [IDI074, 40-year-old male community member].

Treatment Acceptance and Coverage

Participants highlighted several factors influencing treatment acceptance and coverage. Both healthcare workers, CDDs and community members noted that misconceptions about side effects and lack of awareness about the benefits of the treatment were major barriers to MDA acceptance. Below are some quotes from a healthcare worker and a community member to underscore these positions: Some, too, because of the misconceptions about the drugs, that's why they refuse to get treatment. [IDI 19,30-year-old male community health nurse].

Initially, people in my community were not appreciative of the project because they feared the side effects of the drugs, specifically swollen legs. However, after some time, those who took the drugs encouraged others to do the same, and that's how I got non-respondents to participate. [IDI,03, 20 Years old male community member].

I have been collecting the medicine from the CDD, but I don't take it because I don't know what kind of bacteria the drug is going to fight in me. There are some drugs with side effects, I was working in a hospital, and I have seen what the side effects of drugs can be like. The guy had a swollen face, and because of that it has been a benchmark for me. [IDI,12, 27 Years old male community member].

Implementation and Perceptions of Testing

The introduction of the T&T approach was generally well-received. Healthcare workers appreciated having a diagnostic tool to identify infected individuals more accurately. One healthcare worker remarked, the testing is also one thing that helped a lot. People don't want to take the MDA; when you ask them why they will say that no insect has bitten them and others. So, the testing really helped us to convince such ones to take the drugs. [IDI,019,32 Years old male community health nurse].

The ability to offer immediate results was also crucial in the testing implementation. Many community members expressed appreciation for the opportunity to know their status quickly, which influenced their decision to accept treatment. A community drug distributor noted, they were happy that we conducted the tests. Some of them thought that we couldn't test for the disease

and get immediate results. However, when they saw us testing others, they realized the importance of participating [IDI, 23-year-old male community drug distributor].

Community perceptions of the testing strategies were largely positive, as many individuals found value in knowing their infection status before receiving treatment. The testing approach not only address doubts and fears but also empowered community members to take action regarding their health. As one participant stated: People took part in these studies because of the testing that was happening. A woman came to us to test her because she hasn't taken the drugs in a long time and now, she feels as if her legs are becoming big [IDI, 49-year-old male community health nurse].

Confidence and Training of Healthcare Workers and CDDs

Training played a critical role in the confidence levels of healthcare workers and CDDs. Most participants felt well-prepared to implement the E&T and T&T approaches after undergoing training sessions. A CDD explained: The training was highly beneficial as it provided us with the necessary rules and regulations for the job. It especially helped us understand how to conduct the testing, which we hadn't done before. Testing played a significant role in convincing those who doubted their need for the MDA drugs to take them. The training was crucial in ensuring the success of the program. [IDI 19,32 Years old male community drug distributor].

However, some healthcare workers indicated a need for ongoing training and support.

The training provided helped both the CDDs and nurses because we were taken through all the aspects of the disease. All the necessary things were done at the workshop; it was very nice. That workshop should come again so that everybody who was not in the workshop the other day will also participate. That will help us to eradicate the disease once and for all. [IDI 03, 46 Years old male community health nurse].

Duration and Success of the Activity

The activities were conducted over four months, during which time significant progress was observed. The E&T approach facilitated increased engagement with previously non-compliant individuals. A community drug distributor reported this very clearly when he said: Some of them were happy that we made the effort to reach out to them. Others were initially present during the main MDA but refused to take the drugs. However, with your approach, they eventually accepted it. [IDI,013, 23 Years old male community drug distributor].

Challenges

Several challenges were identified, including logistical issues, such as transportation difficulties and inadequate supplies. A community member represented this view in the following quotation.

The only challenge this study poses are the night blood collection for those who test positive. The nurse going to the community members at 9 pm to take blood samples is challenging. Some communities are very far and hard to reach. [IDI 01,33 Years old female community member].

This comment highlights the logistical difficulties and risks involved in conducting night blood collections, particularly in remote areas, which could impact the study's effectiveness, especially regarding LF positivity in the study district.

Facilitators

Facilitators of success included strong community leadership and collaboration with local health authorities. Community leaders played a vital role in mobilizing people and encouraging participation. However, this requires a strong community engagement activity that involves the people, especially the local leadership in the planning and implementation processes of the intervention.

Discussion

This study provides valuable insights into the effectiveness of innovative strategies to improve compliance and MDA coverage for LF in Ghana. The E&T and T&T approaches demonstrated promising results in reaching and treating individuals who had previously missed or refused MDA.

The effectiveness of innovative strategies in improving MDA coverage for LF in Ghana has been a subject of significant research interest in recent years [6]. The successful implementation of the E&T and T&T approaches in reaching individuals who had previously missed or refused MDA, was possible largely due to the direct engagement of the community at the planning and implementation stages. Community engagement has been identified as a crucial factor in the success of MDA programs, with personalized approaches like home visits and tailored interactions being well-received by community members [7,8].

Testing has been highlighted as a key element in increasing acceptance and participation in MDA programs. On-site testing has shown a positive impact in convincing non-respondents to accept treatment, emphasizing the potential of Test and Treat strategies in improving MDA coverage. Immediate availability of test results has been effective in addressing concerns and building trust, suggesting that integrating point-of-care diagnostics into MDA programs could enhance participation rates [9,10].

Disparities in awareness and knowledge about LF and MDA among community members have been revealed, indicating an ongoing need for comprehensive and culturally appropriate health education initiatives [11]. Tailored communication strategies that address local beliefs and misconceptions have been recommended to improve MDA acceptance and coverage [12,13]. Despite the overall positive reception of E&T and T&T approaches, concerns about drug side effects have persisted as a barrier for some community members, emphasizing the importance of clear and honest communication about potential side effects [14].

Logistical challenges such as issues related to timing, accessibility, and awareness of MDA schedules have been identified as reasons for non-participation, aligning with previous research on logistical barriers to MDA coverage [15]. Thus, over the years, MDA implementors have not been successful in finding solutions to these age-long issues bedeviling MDA implementation and we propose the E&T and T&T strategies as means of overcoming these challenges. Flexible distribution

strategies and improved communication channels have been suggested to address these challenges and enhance participation rates in MDA programs [16]. The value of repeated engagement and continuous interactions in improving treatment acceptance has been demonstrated, highlighting the importance of building trust and compliance through ongoing community engagement efforts [17].

Recommendations for increased community involvement in MDA planning and implementation have emerged as a key strategy to enhance ownership and sustainability of MDA initiatives [18]. Engaging local leaders and community members in program design and implementation can further strengthen the effectiveness of MDA programs. The success of combining engagement (E&T) with diagnostic testing (T&T) underscores the effectiveness of an integrated approach that addresses multiple barriers to MDA participation. This supports the call for more holistic and context-specific strategies in MDA implementation.

While this study provides valuable insights, it is limited by its focus on a single district in Ghana. Future research should explore the applicability of these findings in diverse settings. Additionally, longitudinal studies could help assess the long-term impact of E&T and T&T strategies on MDA coverage and LF elimination efforts.

Additionally, this study did not address certain challenges related to these approaches, such as the associated costs, the timing of implementation within routine NTD (Neglected Tropical Diseases) program activities, and whether these strategies are feasible and effective across all settings.

There are also questions about how to address individuals who refuse treatment despite engagement and testing efforts. Future research should explore strategies to encourage acceptance of MDA drugs among this population. Longitudinal studies could further help assess the long-term impact of E&T and T&T strategies on MDA coverage and LF elimination efforts.

The fight against LF is a critical public health endeavor, particularly in regions like the Ellembele District of Ghana, where the disease persists despite extensive intervention efforts. This study's exploration of the E&T and Test and Treat T&T approaches provide valuable insights into innovative strategies that can enhance the effectiveness of LF elimination programs. Our findings highlight the significant impact of targeted community engagement and diagnostic testing in overcoming barriers to treatment acceptance and improving coverage. Misconceptions about side effects and a lack of awareness were identified as major obstacles, underscoring the need for tailored communication strategies that educate and reassure communities about the benefits and safety of LF treatment. The positive reception of the T&T approach demonstrates the importance of integrating diagnostic tools into MDA campaigns, ensuring that treatment is directed towards those who need it most.

The study also emphasizes the critical role of continuous training and support for healthcare workers and CDDs. While initial training bolstered their confidence and preparedness, ongoing professional development is essential to sustain their effectiveness and adapt

to new challenges. This finding aligns with broader public health literature advocating for sustained capacity building in health programs. Strong community leadership and collaboration with local health authorities emerged as key facilitators of success. Leveraging the influence of community leaders can enhance trust and participation, which are vital for the uptake of public health interventions. Addressing logistical challenges, such as transportation difficulties and supply shortages, is also crucial for the smooth implementation of these strategies. The insights from this study provide a roadmap for policymakers and practitioners aiming to eliminate LF. By enhancing communication, integrating diagnostics, providing continuous training, and leveraging community structures, LF elimination efforts can be significantly improved. These strategies do not only address the current challenges but also build a robust framework for sustainable public health interventions. As we move towards the global goal of eliminating LF, it is imperative to adopt a holistic approach that combines medical, social, and logistical strategies. The E&T and T&T approaches represent a step in the right direction, demonstrating the power of innovation and community-centered strategies in public health. By continuing to learn from and adapt these approaches, we can move closer to a world free of lymphatic filariasis. We call on global health stakeholders, policymakers, and practitioners to embrace these findings and incorporate them into their LF elimination programs. Through collaborative efforts and a commitment to innovation, we can overcome the final hurdles in the fight against lymphatic filariasis and achieve lasting health improvements for affected communities.

Conclusion

In conclusion, the E&T and T&T strategies show promise in improving MDA coverage for LF elimination. By addressing individual concerns, leveraging the power of diagnostic testing, and emphasizing continuous community engagement, these approaches offer a pathway to enhance the effectiveness of MDA programs. As global efforts to eliminate LF continue, integrating these insights into program design and implementation could accelerate progress towards this important public health goal.

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