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Community perspectives on anti-helminthiasis mass drug administration for school-age children in Ghana

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Background: Soil-transmitted helminthiasis (STH) infections are neglected tropical diseases that affect populations worldwide, especially in low- and middle-income countries. Groups at risk include pre-school and school-age children as well as women of reproductive age. The World Health Organization (WHO) recommends mass drug administration (MDA) to control STH transmission in all endemic countries. This study explored community perspectives on STH anti-helminthiasis MDA.

Methods: A phenomenological study using qualitative research methods was conducted. In-depth interviews with 15 caregivers, 5 community drug distributors (CDDs), and 3 key informants were conducted in Sekyere Central District, Ashanti Region, Ghana. Interviews were recorded, transcribed, and coded using NVivo software Version 12 (QSR International Pty Ltd., Cardigan, UK), applying both inductive and deductive approaches. Thematic analysis was then performed.

Results: Although some participants demonstrated good knowledge of STH, others attributed its causes to sugary foods. Participants also expressed confidence in traditional treatments, such as the use of herbs and leaves. In contrast, some viewed WHO-recommended medications such as albendazole and mebendazole as harmful. Major barriers to the Mass Drug Administration (MDA) program included limited information about the campaign, low awareness of the benefits of the medications, and insufficient motivation for Community Drug Distributors (CDDs).

Conclusion: NTD programmes should strengthen community education on the benefits of MDA to address gaps in community perspectives and knowledge related to STH and anti-helminthiasis interventions.

KEYWORDS

community perspectives, anti-helminthiasis, mass drug administration, school age children, Ghana

Background

Soil-transmitted helminthiasis (STH) is considered the leading global cause of anaemia, malnutrition, and growth delays among preschool children, school-age children, and women of childbearing age (1, 2). According to the World Health Organisation (2), more than 1 billion people are infected with STH globally. Over 267 million preschool children and 568 million school-age children live in endemic areas where parasite transmission is intense and requires a strong commitment to treatment and prevention (2). The global burden of STH is estimated at 5,266,000 disability-adjusted life years (DALYs) (3).

STH are transmitted through the eggs passed in the faeces of infected individuals (2). The main causes of STH infections include poor sanitary conditions, lack of efficient waste disposal systems, inadequate water supply, and faecal contamination of soil—especially in low-income settings. These conditions contribute to high morbidity, adversely affecting nutritional status and impairs cognitive function (4). They also contribute to the spread of helminths within endemic communities (2, 5). There is no direct person-to-person transmission, the eggs must remain in the soil for approximately 3 weeks to mature and become infectious like (2, 6).

The mass drug administration (MDA) programme is one of the key strategies used to control neglected tropical diseases (NTDs), particularly STH, in many African countries, including Ghana (7). The MDA strategy relies on volunteer community drug distributors (CDDs), who travel through villages to meet caregivers or parents administer anti-helminthic drugs. However, interactions between caregivers and volunteers can sometimes be challenging due to lack of cooperation, and CDDs often report low or no motivation for various reasons (8).

STH remains one of the most widespread infections among NTDs, particularly in areas with poor sanitary conditions (9). Given the burden of helminthiasis infections on individuals, especially poor populations, many initiatives have been undertaken at all levels to fight to control its transmission. In addition to MDA, preventive strategies include improving domestic water supply, environmental sanitation, health education, access to early diagnosis and treatment, and the use of latrines (2, 5). In 2017, approximately 19.4% of rural communities in Ghana had no access to improved drinking water sources, while 50.5% lacked access to improved sanitation facilities (10).

In Ghana, nearly 26 districts are endemic, with the prevalence of STH ranging from 10% to 50% (11). Community drug distributors (CDDs) are an integral part of the anti-helminthiasis MDA programme; however, they are often unmotivated or under-motivated, which can directly and negatively impact the success of MDA interventions against NTDs in communities (8). Although the MDA programme is one of the main interventions short-term interventions implemented to control the disease, the persistence of the parasite has led to increased prevalence of helminthiasis in some communities. This is believed to be due, in part, to inadequate health education and insufficient information among community members about MDA and STH infections (5). Therefore, it is

imperative to explore the knowledge and perceptions of caregivers of school-age children regarding the anti-helminthiasis Mass Drug Administration programme.

Sekyer Central is one of the newly created districts from the most recent administrative division in Ghana (10). It remains limited in terms of financial resources, which has affected the health sector. This is evident in the lack of health facilities, sometimes preventing the district from adequately meeting the health needs of its communities (12).

Several studies have been conducted to determine the prevalence and the effectiveness of its treatment in Ghana and other endemic countries. However, studies exploring community perspectives on anti-helminthiasis MDA for school-age children in Ghana, and the motivation of MDA volunteers, have rarely been undertaken, hence the inspiration for this study. Therefore, exploring community perspectives on MDA in the Sekyer Central District is imperative. This district, which lacks a referral hospital and has health centres concentrated mainly in its central area, presents challenges for identifying certain health problems and delivering appropriate health care. It should be noted that disadvantaged environments lacking proper hygienic measures are at higher risk of STH infections. In such low-income areas—where both health infrastructure and access to health information are limited—communities often resort to traditional treatment methods to manage health problems, hence the interest in conducting this study in this area. The overall objective of this study was to explore community perspectives on anti-helminthiasis Mass Drug Administration for school-age children in Sekyer Central District, Ghana.

The conceptual framework and its narrative

The Health Belief Model (HBM) is useful for explaining individuals' health behaviours and helps identify factors influencing MDA, including barriers and facilitators, and the perceptions and knowledge of caregivers of school-age children about anti-helminthiasis MDA programmes. This health promotion model can be used to improve preventive health behaviours. It consists of six (6) domains (13).

In this study, the HBM is used to analyse the conceptual framework. Perceived susceptibility refers to a person's subjective perception of the risk of acquiring an illness or disease. People differ significantly in how vulnerable they believe they are to illness. Perceived severity refers to an individual's assessment of how serious an illness is, whether if contracted or left untreated. This evaluation often includes both medical consequences, such as death or long-term disability, and social consequences, such as disruptions to family life or relationships. These two constructs of the HBM are reflected in participants' knowledge about STH—its modes of transmission, prevention and treatment, and its consequences. An individual can only assess their risk of contracting a disease and its severity if they have sufficient and

verifiable knowledge about the disease. In addition to this, knowledge of STH is directly influenced by many of the factors in the conceptual framework, including those related to sociocultural factors, the role of distributors, shared information, and the personal situations of caregivers. These factors also directly impact caregivers' perceptions and understanding of the MDA programme.

According to LaMorte (14), perceived benefits are a person's impression of the efficacy of different measures available to minimise the threat of illness or disease (or to cure illness or disease). A person's course of action in avoiding or treating illness or disease is based on assessment and appraisal of both perceived vulnerability and perceived benefit, such that the individual would accept the advised health activity if it were thought to be helpful. Cue to action is the stimulus required to initiate the decision-making process to adopt a suggested health action. These signals might be internal (e.g., chest aches, wheezing, and so on) or external (e.g., advice from others, illness of a family member, newspaper article, etc.). In this conceptual framework, the lived experience factors influence elements linked to drug distributors and also directly affect perceptions and knowledge about the MDA programme. The more beneficial people find a healthy behaviour, the more likely they are to adopt it; the same is true for curative or preventive treatment. In addition, some people may support the MDA programme not necessarily because they have experienced or observed its positive impacts but because they have learned—either from drug distributors, other information channels, or peer counselling—that the programme is beneficial for their children and, by extension, for themselves.

Perceived barriers refer to a person's thoughts about the obstacles to carrying out a suggested health intervention. A person's perception of such obstacles varies widely, prompting a kind of cost/benefit analysis. The individual evaluates the efficiency of the activity against the perception that it may be costly, hazardous (e.g., adverse effects), unpleasant (e.g., painful), time-consuming, or inconvenient. To improve perceptions and knowledge about the programme, these barriers need to be addressed by enhancing the incentives for CDDs, improving their training, strengthening the process of sharing information about the MDA, and considering socio-cultural aspects—among other factors identified in this conceptual framework.

There is a direct interrelationship between caregivers' personal situation, sociocultural factors, factors linked to drug distributors, and factors linked to information and knowledge about STH. That is, the above-mentioned factors influence knowledge about STH. The factors linked to information, the lived experience factors, and knowledge about STH also directly impact the MDA programme in the conceptual framework. So, when community members are not well informed about the anti-helminthiasis drug, they are less likely to trust distributors, hence decreasing compliance to take the drug.

This conceptual framework shows the different factors that interact with each other and directly influence the perceptions and knowledge of caregivers about the anti-helminthiasis MDA programme.

Methods

Study setting

In Ghana, the Ashanti Region is a core area of the Asante Kingdom, whose boundaries stretched south to the Atlantic Ocean and north to the Gonja and Dagomba lands during the 18th century. The Asante Kingdom extended beyond the country's current borders to the east and west. This territorial expansion occurred through conflicts and the conquest of territories from other ethnic groups (15).

The region covers an area of 24,389 km², or 10.2% of Ghana's total land area, and is located in the southern half of the country. It is the third-largest region, after the Northern and Brong Ahafo Regions. It shares borders with the Western, Central, Eastern, and Brong Ahafo Regions. More than half of the region, including its southwestern part, lies in the semi-equatorial forest zone, while a smaller northeastern section falls within the savannah zone. Each district is divided into sub-metros (15).

In 2017, the population of the Ashanti Region was estimated at 5,661,728 (16). Sekyere Central District served as the site for this study. It is one of the districts in the Ashanti Region, with 85,241 inhabitants as of 2017 (17).

Sekyere Central District lacks a number of health facilities. The district cannot boast a single hospital. There are four (4) health centres, five (5) maternal and child health clinics, and two (2) private/missionary clinics—most of which are centred around the district capital (18). This means that people in the rural parts of the district do not have access to many health centres. According to Report (12), efforts are being made to build more premises and housing for CHPS staff in the rural communities. This is one of the districts in the region where STH infection is prevalent.

The district has 60 nursery schools, 60 primary schools, 41 middle schools, and three (3) high schools. Despite the district's extensive educational infrastructure, the level of education remains concerning, as 33.8% of the population aged 11 years and above is illiterate, while 66.2% is literate. Facilities need to be improved to enhance teaching and learning. Due mainly to financial constraints, about 20% of school-age students are not enrolled in school (12).

Study design

This was a phenomenology study using a qualitative research approach. Phenomenology (19) is a study design based on philosophy and psychology in which the researcher explains an individual's perception of a phenomenon as described by the participant. This description culminates in several individuals experiencing the phenomenon and identifying the essence of those experiences. In this regard, the investigator put aside all prejudgements and relied on intuition, imagination, and structure to access the lived experience of the study group. The aim is to identify what the participants have in common in terms of their knowledge of the phenomenon. Phenomenology is one of the most

appropriate designs for a study that seeks to explore people's knowledge and perception of a phenomenon such as the MDA programme (19).

Study population

The population of this study was residents of the Sekyere Central District and, more specifically, those who care for children of school age. Secondly, people who are involved in drug distribution, referred to as CDDs, were included. The third and final group of participants consisted of community leaders, who were interviewed as key informants because they serve as liaisons between communities and health workers/or CDDs involved in anti-helminthiasis MDA campaigns.

Sample size

A sample can be explained as any representative part of a given population that is proposed to be studied (20). In qualitative studies using interviews as a data collection technique, 20 participants are often sufficient to reach saturation (21). The sample size is flexible and often justified by data saturation, which is progressively determined (22). In 2009, Francis reported that with 13 interviews, one has a strong chance of capturing all the data related to the subject of study and thus reaching saturation.

The concept of data saturation was introduced into the field of qualitative research by Glaser and Strauss (23). It refers to the point in data collection where the researcher no longer finds additional new data that develops aspects of a conceptual category (24). Therefore, for this study, 15 caregivers of school-age children, 5 CDDs, and 3 key informants (community leaders)—a total of 23 participants—were interviewed.

Sampling method and participants recruitment

Participants from the Sekyere Central District were purposefully sampled for the study. Researchers widely use purposive sampling in qualitative research to identify and select information-rich cases related to the phenomenon of interest. Specifically, maximum variation sampling, which is a type of intentional sampling, was used to select participants with broad behavioural knowledge. This also allowed for the identification of important common patterns while establishing a fact by comparing different pieces of information (25).

We interviewed various community members, including caregivers (parents or guardians of school-age children) and community drug distributors (schoolteachers and some community members). In addition, we interviewed key informants such as community leaders (religious leaders and local or traditional authorities) who play a key role in implementing the STH MDA programme in their communities.

The participant recruitment process considered variation in certain characteristics. For example, for caregivers, we took into account their professional category (housewife, shopkeeper or merchant, and worker); for CDDs, we considered their affiliation with different programmes (teacher, school official, and worker); and finally, variation in socio-demographic characteristics (age group, sex, socioeconomic level, proximity to the health structure, and area of residence) was taken into account in the selection of all participants.

Determination of saturation

Recruitment and interviewing of participants continued until the data reached saturation. This means that no new information emerged, and themes relevant to the study began to repeat during the data collection process (24). Saturation was gradually determined during collection and through continuous comparison of the data. This was done by the principal investigator (PI), the research assistants, and with the help of an external person (an experienced researcher), who listened/read the interviews and determined the level of saturation by identifying repeated themes. This was an iterative process that took place alongside field data collection. Prior to this, a meeting was held every evening on each data collection day. The PI and research assistants reviewed progress together, which allowed them to identify emerging themes during the initial phase of data collection. Afterward, the external person carried out the same exercise to validate data saturation.

Data collection tools and techniques

To fully understand caregivers' perspectives on anti-helminthiasis MDA—and possibly the challenges faced by CDDs during MDA campaigns—data were collected using interview guides for caregivers, CDDs, and community leaders.

Three (3) different interview guides were developed according to the different participant groups: an IDI guide for caregivers, an IDI guide for CDDs, and a KII guide for community leaders. In addition, all interviews were recorded using audio recorders by the research assistants throughout the data collection process. Field notes were also taken simultaneously during the interviews. These notes described the unspoken expressions of participants, as well as other relevant observations that could not be recorded by the audio device.

Most of the interviews were conducted in the local language (Twi), and in English for participants deemed suitable to answer questions in English.

In-depth interviews

The information from the literature review, formal discussions with NTD programme managers, and the research questions were used as a basis to design in-depth interviews (IDIs) for caregivers of children and CDDs. As the main focus, the IDIs helped explore the perspectives and levels of knowledge influencing caregivers of school-age children regarding STH and the MDA. The same

approach was applied to the CDDs, focusing on the major challenges they face in their activities and the possible ways and means of solving them.

Key informant interviews

Key informant interviews are in-depth qualitative interviews with key actors in the implementation process of a project. These individuals are involved in various ways and are knowledgeable about what is happening during the implementation process. For this study, the key informants were community leaders who observe the experiences of CDDs, health workers, programme managers, and community members during the MDA. The interviews with these key informants aimed to gather insights from resource persons who understand the entire MDA implementation process. The guides first explored their knowledge and perception of anti-helminthiasis MDA campaigns, followed by the main challenges encountered during MDA.

Data processing

All interviews were recorded with participants' permission. Interviews conducted in the local dialect were transcribed verbatim and simultaneously translated into English with the assistance of the research assistants. The PI reviewed, verified, and confirmed all transcripts to correct grammatical errors and to address any potentially skipped or mistranslated words and expressions.

Data analysis

Data were coded using both deductive and inductive thematic analyses. Deductive coding was applied to information drawn from the existing literature. This step was followed by inductive coding, during which new themes were progressively identified from the transcripts through multiple readings and re-readings. The terms emerging from the interviews were coded and grouped into subcategories and then into categories based on their differences and similarities.

Data were analysed using NVivo software Version 12 (QSR International Pty Ltd., Cardigan, UK). A codebook was created based on the study objectives, and each transcription was opened in NVivo software. A line-by-line reading and coding were performed. The codebook was gradually refined throughout the process. The main emerging categories and subcategories were summarised in words to facilitate interpretation, data presentation, and the selection of representative citations for the results section.

Quality control

For quality assurance, the principal investigator (PI) developed a training module for the research assistants. A pilot study was

conducted in a peri-urban area of Accra (a community with similar characteristics to the study site) to test the tools, which helped refine and improve them to ensure that all necessary information was gathered for the thesis. The pilot study also allowed for the consideration of all ethical aspects.

During field data collection, the accuracy and completeness of the data were checked, and necessary corrections were made while maintaining neutrality. After each interview, the research assistants double-checked to ensure that the audio had been properly recorded and saved with the assigned participant code, date, and location.

The PI was present in the field with the research assistants to supervise the process. In addition to supervision, the principal investigator's mission was to assist in resolving any challenges the research assistants encountered and to answer participants' questions about the study if the assistants were unable to do so.

Establishing trustworthiness

To ensure the reliability of the study results, the strategies suggested by Kay (26)—credibility, transferability, reliability, and confirmability (or neutrality)—were applied. Credibility, reliability, and confirmability Kay (26) were ensured by triangulating data from different sources, including the literature review, caregivers of school-age children, CDDs, and community leaders. Transferability was supported by providing a detailed description of the tools and methods used throughout the study. Neutrality (or confirmability) was achieved by maintaining clear boundaries between the research team and the participants, and ensuring that the relationships established between them (researchers and participants) did not affect or influence the data collected.

Ethical considerations

The study was approved by the Ghana Health Service Ethics Review Board (approval number: GHS ERC 070.03.20). Formal permission was obtained from both the Regional Health Directorate and the District Health Directorate office of Sekyere Central District prior to field data collection. Each participant gave informed consent to participate and to be cited anonymously in the write-up (thesis and any peer-reviewed article).

Sponsorship/protocol funding

The WHO's Special Programme for Research and Training in Tropical Diseases (TDR) supported this study. WHO/TDR provided funding for the study and field research. The principal investigator (PI) carried out all other aspects of the study with support from the School of Public Health at the University of Ghana.

Data storage and usage

All data were anonymised and coded before analysis. The data file stored on electronic devices is password-protected and accessible only to the research team and the study supervisor.

The data collected for this study were used solely for scientific purposes—to inform decision-makers and to support future research on similar issues.

Results

This chapter presents the findings of the study in response to the research questions. Upon analysing the collected data, the results were organised into six categories: (i) socio-demographic characteristics of participants, (ii) knowledge of helminthiasis, (iii) perception of the helminthiasis MDA programme, (iv) factors influencing participants’ perceptions, (v) participants’ experience, and (vi) attitudes towards the delivery of MDA.

Socio-demographic characteristics of participants

A total of 23 participants, all from the Sekyere Central District in the Ashanti Region, took part in this study, as shown in [Table 1](#). They included 15 caregivers—10 of whom were interviewed in urban areas and 5 in rural areas; 6 community drug distributors (CDDs)—4 from urban areas and 2 from rural areas; and 4 community leaders (or opinion leaders) who served as key informants—2 from each site (urban and rural).

Among caregivers, the age range was between 29 and 79 years. Among CDDs, the age range was between 26 and 50 years, and only one was a woman. The key informants were aged between 26 and 60 years, and all were male. Most participants were married and Christian. The majority of caregivers had no formal education and were engaged in various non-skilled jobs, such as commerce and agriculture.

Knowledge on helminthiasis

The three groups of community members who participated in this study demonstrated broad and varied perspectives on helminthiasis, particularly regarding its causes and/or modes of transmission, prevention, treatment, symptoms, and areas of risk. Each group described these aspects from its own perspective, based on their different sources of information.

Community members’ knowledge of helminthiasis

Some community members, particularly caregivers of children in this study, demonstrated varying understandings of the causes of STH infections. Some participants believed that STH could be caused by flies or by eating sugary foods. Many attributed STH infections to a range of causes, depending on their different sources

TABLE 1 Socio-demographic characteristics of study participants.

Characteristics of study participants			Number of participants
Participants for IDIs			Key informants
Area of residence	Caregivers	CDD	
Urban	10	4	2
Rural	5	2	2
Sex			
Male	6	5	3
Female	9	–	–
Age (years)			
<26	6	1	1
30–39	7	3	1
40–49	–	–	1
50–59	–	1	
60–69	1	–	1
70+	1	–	–
Education Level			
No Formal Education	5	–	–
Primary	7	–	–
JHS	2	–	1
SHS	1	3	–
Tertiary	–	2	3
Religion			
Christianity	15	5	3
Traditionalism	–	–	1
Occupation			
Trader	6	–	1
Farmer	9	–	1
Masson	–	1	
Teacher	–	4	–
Engineer	–	–	1
Accountant	–	–	1
Marital Status			
Single	–	2	–
Married	12	2	3
Cohabitant	3	1	–

of information. The diversity in caregivers' knowledge of STH infections also influences the available community-based approaches for managing confirmed cases in children, as presented in detail below:

"...when you eat sweets such as sugar, they can get into your body" IDI_26y_Female_CG_R. Furthermore, the same participant gave more specifications on the specific types of foods that children often crave and that she believed could lead to STH infection. She named these as:

"...biscuits, chocolates, kalypo [type of candy], toffees and other sugary drinks. When you take these items frequently you become at risk of getting STH".

The details she provided extended the perceived risk of infection to all individuals—children and adults alike—who frequently consume sugary foods. However, the focus on children is due to their limited ability to discern what is good or bad for their health, and their tendency to give in to desire. Adults, on the other hand, are assumed to be aware of the hidden dangers behind what may harm their health. Therefore, children are considered more vulnerable and of greater concern.

Some participants also reported that STH infections are sometimes associated with evil spirits. In such cases, they believed that no dewormer could eliminate the parasites. The association of evil spirits with infection was seen as a complicating factor in care, suggesting that in some cases, spirituality is considered a necessary means of treating STH infections. Among these spiritual recourses are individual prayer by the caregiver, the intervention of a pastor, or collective prayer at church. According to this belief, evil spirits can worsen a patient's condition to the extent that deworming medications are ineffective—thus, the perceived effectiveness of medical treatment is called into question in favour of spiritual responses. These beliefs were particularly predominant among participants interviewed in rural areas.

"For the spiritual cause, you will take all the different dewormers in the world, doctors will prescribe different drugs for you, yet you will still grow skinny and become ugly. With this, you can tell that this STH is not the normal one but rather related to spirits" IDI_38y_Female_CG_R.

However, for other groups of participants, helminthiasis results from open defecation, walking barefooted on infected soil, and eggs laid by flies on utensils. That is why people, according to them, need to take care of utensils, bowls, and any edible food by washing and covering them properly. The eggs laid by flies are undetectable to the naked eye, and as such, caution is needed because these particles (referred to as "eggs") can end up on any type of food, eating plate, or bowl.

Children were identified as the most at risk of contamination by this group of participants who supported this perspective on the transmission cycle of helminth infections. This is because children are unaware of the dangers associated with contact with contaminated sites and, on the contrary, are often attracted to

them—hence their high risk of infection. Similar comments explaining this transmission process were made by participants from both our study areas (urban and rural).

"...when you go, and you ease yourself, and you leave it like that, at the end of the day when no animal eehh gets to that thing, ... it will be rotten, and when it rotten, it will mix with the soil. So anytime, even wind can transfer that faeces and spread it all over that area. So, the place will become contaminated. So that one, it can cause the diseases" IDI_35y_Male_CG_U.

"... Flirty can bring something like that because it is like you eating in a bowl and not washing it, then flies will come and settle in it and shit in it. You go for that bowl thinking that it is clean because you cannot see the germs with your naked eyes, so you put food in it and eat it. I think this can create that problem for you to get the disease" IDI_34y_Male_CG_R.

Besides the above explanations provided by participants, caregivers also expanded on additional modes of parasite transmission and identified risk areas in the helminth transmission cycle. They cited locations such as cold places, damp areas, and other generally dirty sites.

"So, if you don't err clean our environment and we come into contact with them, it is easy that we can pick these particles from the soil and you know most, children play on the floor, and they can pick these organisms which can cause diseases to them" IDI_79y_Male_CG_U.

Others also believe that rural areas are more at risk due to the lack of modern toilets, limited access to clean drinking water, and the absence of habits that promote a clean physical environment.

"In our villages, most part of them, their hygienic conditions are very low. So, right now, we are sitting here; if you look at the pipe side, you will see some rubbers and rubbish there. Some do not have access to pipe water" IDI_34y_Male_CG_R.

Consequently, some individuals—especially children—experience symptoms such as stomach aches, lack of appetite leading to constant hunger, weight loss, and vomiting, which are seen as signs indicating the presence of worms in the belly. The worms are sometimes even visible in the faeces of infected children, particularly when the contamination has persisted without treatment.

"When they get into the human body, they can cause you to lose your appetite, resulting in weight loss and shrink in size" IDI_38y_Female_CG_R.

To deal with this, participants in this study listed several means of preventing and treating helminthiasis infections. Many of them emphasised hygiene, including both personal and environmental hygiene.

“So, what we advise is that we have to know how to keep things hygienically so that our children will not be contact with that disease [STH] and keep frequent handwashing” IDI_79y_Male_CG_U.

However, one participant believes that in addition to these means, “prayer” is a method she relies on and uses to prevent all forms of infection, particularly STH, *“all that I do is to pray for God’s protection for my children”* IDI_38y_Female_CG_R. Others go so far as to interpret what the Holy Scriptures say about seeking protection through prayer and the use of leaves, as taught in the Bible.

“As for spiritual, as I said earlier, we do pray to God for prevention, but traditionally, as I said also, God gave the leaves and everything to us. So, even in the Bible, He said we should use the fruit, ...” IDI_29y_Female_CG_U.

That is why, in cases of STH infections, some participants boil herbs that they drink or give to children to eliminate the infection:

“Given the child ee the local medicine, yeah, you see ... what we call ‘duduo’ [leaves name in local language Twi], as soon as you get up in the morning, Kwame, Kwasi [some names] come and take this drink before even he gets food to eat, every day. So that he can be prevented from all these, I mean sickness” IDI_79y_Male_CG_U.

While others believe that combining traditional medicine with modern medicine is an effective approach. Those who opt for “modern” medicine get their supplies from pharmacies or street stalls and give them to their children:

“Yeah, it’s very good. But eee let me say, the drugs too, God gave them the knowledge and through this knowledge, they have polish it in a such a way that when you use it too, you can be also cured ... I sometimes go to market buy some ... So, they are all good to be used, but the traditional one is very sharp, yeah” IDI_29y_Female_CG_U.

Knowledge of CDD on helminthiasis

CDDs are important actors in the MDA process, and that is why they were selected as key informants for this study. During the interviews, they mentioned that helminthiasis parasites are transmitted through several means, including soil. This may

occur through various possibilities, as described by one of the CDDs encountered in a rural area:

“Well, you see if the disease is in the sand and you step in the sand, then you will get it. If you also use your hand to scratch the ground to you might get. You see, that is why the disease is quite common among children. And you see the personal hygiene of children are not that encouraging even when they are eating, and their food falls on the ground, they will pick it up and eat. So, these act of theirs promotes the rate at which they contract the disease” IDI_50y_Male_CDD_R.

Later, another CDD cited spitting as a means of transmitting STH. Once an infected individual spits on the ground, the germs mix with the soil, and any other person—especially children—who comes into contact with that contaminated soil may become infected:

“So if one has it and maybe spit because it is through the soil, the germs can mix with the soil. So, if another child gets interacted with the soil, that will also ... the child may also pick it from the soil” IDI_36y_Male_CDD_R.

Helminthiasis parasites were also described as being common in dirty places, where anyone present is exposed to infection. One participant even believed the parasites could be transmitted through the air: *“It can pass through air”* IDI_50y_Male_CDD_R. Others cited the consumption of unwashed salty foods as a potential risk, and described specific hygiene measures that could eliminate germs. Below is the explanation of a CDD encountered in a rural area: *“Then, vegetables and fruits which have not been properly washed, especially with salt, to kill the germs”* IDI_33y_Male_CDD_R.

Regarding prevention and treatment, CDDs frequently mentioned the importance of periodic deworming as promoted in MDA campaigns: *“we should practice the habit of deworming ourselves regularly”* IDI_26y_Male_CDD_U. Another CDD from a rural area highlighted the need to promote and maintain a clean physical environment to prevent contamination: *“I think the most important thing is to always keep our environment clean”* IDI_39y_Male_CDD_U.

Knowledge of community leaders on helminthiasis

The study results also revealed the knowledge of community leaders—who play a vital role in MDA campaigns against helminthiasis—regarding the modes of transmission of the disease.

“I was saying that this disease mostly affects children because they normally play in the sand, and as they play, they might touch some of the worms of which they might not know. So, through this, the worms get into their body, and because of that they contract STH” KII_52y_Male_CL_R.

Dirty places and the careless placement of garbage cans—especially when left anywhere—are seen as real reservoirs for helminthiasis parasites, and this is considered a bad habit. That is why one opinion leader acknowledged that an unclean physical environment is one of the factors contributing to STH:

Community leaders also indicated that helminthiasis parasites are harmful to health, particularly to children, who are in constant contact with all the forms of transmission mentioned above. According to them, medicines remain effective in the body for up to three (3) months, which is why children must be kept in proper hygienic conditions to prevent contamination.

“When the child practices good hygiene, the child is not likely to get the disease. Moreover, the drug only stays in the body for three months” KII_60y_Male_CL_U.

Community perspectives or perceptions about helminthiasis MDA programme

In this study, participants’ perceptions of MDA anti-helminthiasis were categorised into two (2) types: positive and negative perceptions.

Positive perceptions

Several participants expressed positive views about the anti-helminthiasis MDA programme. They found the programme useful for both the rich and the poor. As one participant put it: *“The programme helps the rich and the poor because the government is not selective when running the MDA programme provided you meet the age range”* IDI_28y_Female_CG_R. This participant continued in the same direction but placed special emphasis on the programme’s importance for the poor. Although the programme is useful for everyone, it is particularly beneficial for economically vulnerable groups—especially parents who cannot afford periodic deworming sessions or hospitalisation fees for their children in case of STH infection. For example, she explained: *“What I know is that it helps us because not all people are able to afford the drug and the protective measures, we take may not be sufficient in protecting us, so it supplements it to protect us against the disease. Some people also forget to take de-wormer, so the government one helps a lot in our health”* IDI_28y_Female_CG_R. Participants also said that MDA campaigns improve children’s health, especially in terms of rapid physical development when they are protected from STH infections. As one caregiver stated: *“it promotes child growth and protects the children from contracting the disease”* IDI_62y_Male_CG_U.

Some CDDs, in turn, argued that distributing deworming medication to school-age children is helpful and supports their learning process. One of them stated: *“...they [parents] are happy about it, that the government is giving such drugs to their wards, so, that they will be prevented from infection of wormers to boost their system, so that, they can study comfortably”* IDI_62y_Male_CG_U.

There was also a positive interpretation of the body’s reaction to the medication. For him, the reactions of the products prove how effective they are and that they are in the process of eliminating parasites. This interpretation came from one of the CDDs he met in a rural area.

“Yah you see when we give the drug, as I said earlier some begin to show some reactions which means that the drug is really working because when the person hadn’t taken the drug, he or she was not showing such reactions” IDI_50y_Male_CDD_R.

Negative perceptions

The results of this study showed that two (2) of the three (3) participant groups—notably caregivers and CDDs—expressed some reservations about the anti-helminthiasis products distributed through the MDA programme. For some caregivers, the drugs of modern medicine (ALB and MEB) are not considered sufficient to cure STH infections: *“Sometimes the drug they give doesn’t cure the disease”* IDI_28y_Female_CG_R.

Further on, the same participant made it clear that she had just completed an exciting discovery on how to treat STH infections through herbs that are widely used in treatment in the country. According to her, these herbs can help patients who have lost their appetite to regain it.

“These days, I learnt that the traditional herbs are now used more often in this country. At first, they used to export it to other countries. I didn’t even know that Onwono [name of a tree used to heal STH infections by the community] was effective in treating STH I just found out recently ... That one can help you to regain your appetite when you chew” IDI_28y_Female_CG_R.

In the same vein, one CDD mentioned that he believes more in traditional medicine—using herbs and leaves—than in modern medical products, which he described as being full of chemical elements harmful to human health. He also invoked and recognised the providence that God gives us. His detailed explanation is presented below:

“Yeah, in my own opinion, I will prefer the use of the local one [medicine] instead of the white man [medicine]. Because the white man medicine, they are full of chemicals and once we are here, God has given us everything we need so I do not see the reason for much on the drugs which come mostly from abroad. Yah for me if I am given a chance to choose between, provided the local one is workable, then I will go for the local one because that is more organic than the refined ones” IDI_36y_Male_CDD_R.

Always expressing doubt about the medicines of the “white” people—as he calls them—he wonders about their origin and

efficacy. He held the opinion that national leaders are “crisis businessmen” who care only about money and are willing to do anything to achieve their goals, even at the cost of their fellow citizens’ lives. This opinion, according to him, is also shared by some elites, who wonder why doctors, nurses, and other health professionals do not give these drugs to their own children, yet expect others to give them to theirs. As teachers and those in charge of distribution, CDDs are obliged to follow directives from higher authorities. However, in order to convince pupils that the medication is safe, they are sometimes forced to take the drugs first in front of them. Even though they may experience side effects after taking the medication, they feel compelled to do it. That is why he said the following:

“... at times we would want to find out where the drugs might have come from. Because we hear that, erm as for these drugs, because our leaders want money, so anything which is not good, let me put it this way, anything which is err harmful, is for Africans. So, our leaders would go and then take money ... like this err ... So that is the perceptions most of us, especially the elite ones about these MDA ... we do not see doctors and nurses given those drugs to their children. So, if you are not given it to your children, why do you want other people children to take ... So, at times it is exceedingly difficult, but because we are teachers, we take it to show that it is good and therefore it is not anything poisonous before we give it to them. That is what we have been doing” IDI_36y_Male_CDD_R.

Another CDD mentioned that some parents refuse to allow their children to take part in the MDA programme because they believe the medicines being distributed are expired—and, for that reason, brought to Africa and distribute it for free:

“These were drugs that have been expired in someone country, and they have brought it here to give to the Africans. So, some [parents] came here and report...” IDI_36y_Male_CDD_R.

Another CDD also reported that some community members refuse to subscribe to the MDA programme against STH because they believe it is a method of controlling fertility among the very young (children). As he explained: *“Oh, at times some people will be saying that these drugs have been given so that their wards won’t birth and those kinds of things”* IDI_26y_Male_CDD_U.

Sociocultural factors influencing community members’ perspectives

Factors influencing participants’ perceptions of adherence to MDA—whether acting as barriers or facilitators—were explored in this study. These factors were primarily categorised as either barriers or facilitators to adherence to MDA campaigns in the fight against STH.

Barriers to MDA implementation

The various participants in this study have exposed elements that constitute obstacles or blockages to the implementation of MDA programmes. The main barriers included lack of information, non-involvement of parents, side effects of medication, and lack of motivation for CDDs.

The data showed that a lack of information is a hindrance to the effective implementation of both MDA and STH campaigns. This lack of information, which was noted by many of the participants, has several aspects, including insufficient details about the drugs being distributed, who they are intended for, why they are given, their possible side effects (both positive and negative), and where the drugs originate. These were among the questions raised by participants about the MDA programme.

As one mother in Nsuta explained:

“...challenges are there, this is what I’m saying that you don’t see the I mean, the health personnel giving information about all these things [MDA & drugs to be distributed]. That’s it...” IDI_33y_Male_CG_U.

This lack of communication and information about STH medications—including the expected reactions or side effects of ALB and MEB after administration—was a significant barrier for many participants. As a result, they expressed a strong desire for health workers to provide them with complete and transparent information about the drugs. For one key informant, giving information in parts and omitting undesirable aspects was considered unfair.

“Yes, because when the person does not speak the truth about what can happen by taking the drugs, you cannot also give out the drug ... When we take the drug, we will go to the toilet some days or probably three days after taking the drug [you will have running stomach]; you must make it known before we give out the drug. But when such information is not given, even me I would fear taking the drug. So, you must make it known so that we the people can see the effectiveness of the drug” KII_52y_Male_CL_R.

Another important aspect that needs to be considered in this programme—although it is school-based—is the involvement of the students’ parents. An opinion leader pointed out that one should not assume children will inform their parents after school about the distribution of the planned medicines. According to him, it is the responsibility of the programme to inform parents directly; no reversal of roles is possible.

“I think with kids when you talk of drugs if the parents are not involved, and you talk about it in school, they simply forget about it. It is only a few and intelligent ones or the curious ones who will come home and talk about it” KII_60y_Male_CL_U.

Fuelled by the non-involvement of parents in the process, some CDDs acknowledged that the system for disseminating information about drug distribution to parents is ineffective. They noted that relying on students—the programme beneficiaries—as informants is flawed. In many societies, the general belief is that one does not prevent disease but rather acts to cure it. As a result, questions are often raised when medications are offered to someone who appears healthy.

“They will hear that, or the children will send the information to them that they are giving us drugs at school and you know most at times based on our culture, we only take drugs when we are sick. So, the parents some of them will say that aa, but you are not sick why are they giving you drugs. Yah ... so when the information is not ... erm. giving to them for them to know the importance of the drugs, that causes some of these resistance” IDI_39y_Male_CDD_U.

He went on to argue that it is the children who serve as informants to their parents about the programme: *“We use them as our campaigners for them to go and give the information to the parents, and try to disagree their mind from some of these things”* IDI_39y_Male_CDD_U.

The manifestation of side effects—and how they are managed—remains a significant concern for parents. However, CDDs often do not give sufficient weight to parental complaints or pay close attention to the effects of the drugs on children. Such concerns have either been trivialised or interpreted positively.

“So, I tell them that because they have the disease present in their body that is why they give those reactions. There are some people that, days after taking the drug, would still show the reaction” IDI_50y_Male_CDD_R.

These side effects—and their trivialisation by the CDDs—provoke anger among parents: *“There are some parents after their kids get those reactions to get angry at us”* IDI_50y_Male_CDD_R.

There are times when the children themselves report ailments to their teachers after taking the medication. One CDD explained:

“At times, the children eerrrrhhh, the children itself will tell us when they see us around that these drug makes them weak and at times have a headache. The parents also call and report such an incident to us” IDI_33y_Male_CDD_R.

Another shared:

“We had let say, three or five learners who were vomiting that day, that was their first day, but as times goes on, it was normal in their system. A parent called the next day that his daughter had been admitted at the hospital” IDI_26y_Male_CDD_U.

Despite complaints from both parents and students, some teachers remain idle, viewing these reactions as ordinary occurrences. One CDD reported: *“We do didn’t do anything, we just allowed the system to work out”* IDI_36y_Male_CDD_R.

All CDDs reported that they receive no incentives (no bonus) during MDA activities. They carry out the distribution simply because the directive comes from central authorities and must be followed. They are required to respect them and cannot act otherwise.

“...when it comes to school, they just give it to the headteachers to do it and so for the headteachers, they don’t get anything” IDI_36y_Male_CDD_R.

While CDDs receive no bonuses, health workers reportedly get a small allowance for each outing.

“But I think for the health workers when they go round; there are some motivations. There are some motivations they get from it, and they also get allowances” IDI_36y_Male_CDD_R.

It should be remembered that the lack of motivation among CDDs is one of the obstacles to the successful implementation of MDA programmes—even though most say that serving the community is valuable in itself.

“As I was saying our work is voluntary, they don’t pay us for our jobs. We just have the thought that if Ghana health service is willing to help the community, why do not we help. I have worked for 13 years now without they are paying us, but it is my will to help my country. Even if there is something to be given and I do not go and represent this community, that means the community would not get some unless I go to interviews and workshops with my own money” IDI_50y_Male_CDD_R.

Facilitators of MDA implementation

The factors that facilitate the implementation of MDAs in communities were identified during this study across the three (3) target groups. These include the provision of preliminary information before drug distribution, general awareness, the school-based nature of the programme, free management of side effects, motivation of CDDs, and the involvement of opinion leaders.

Information and communication are two key elements that, when integrated into programme implementation like MDA, promote adherence. The more informed people are, the better they understand—and therefore accept—the programme. For this reason, it is essential to diversify the channels of communication so that everyone can access information on their own.

“...so, advertising it on TV and radio, the same way, as well as one on one, will help others who don’t have a radio or TV to get informed. Those who got it from one on one will inform others that there is this ongoing program for people to patronise in it” IDI_32y_Female_CG_R.

Continuing to demonstrate the importance of prior information about the MDA programme, one participant stated: *“Oh, depending on how they announce it on the television. Sometimes when they make the announcement, they talk about how important it is to take the drug so with such knowledge I wouldn’t want to miss it”* IDI_28y_Female_CG_R.

Participants made it clear in their responses that they would appreciate being informed in advance. If they receive the necessary information, they are more willing to allow their children to participate in mass distribution campaigns. It is unreasonable, they suggested, to arrive unannounced and expect people to adjust.

“Me, for instance when you just come to my house and tell me you are distributing drugs so I should come for mine, I wouldn’t take the drug since I had not been informed. But when the announcement is given that, there would be an MDA programme, then my family and I would take part since we had already gotten information. But when you come unexpectedly, I won’t take the drug” IDI_38y_Female_CG_R.

Passing on information is important, but choosing the right channels to deliver that information for greater impact is equally crucial. In addition to radio and television, information campaigns can also target places of worship, as one study participant noted.

“...when they do come here [church] and proclaim or announce it, then, we are also aware of it, so that we can even sit down...” IDI_28y_Female_CG_R.

Sharing information about MDA dates and the benefits of the medication is one effective way to involve parents. This information helps inform and guide their decisions about the drugs and whether to allow their children to participate in the anti-helminthiasis programme. This was emphasised by one of the rural drug distributors as follow:

“As I said, eh..., before they will bring in these drugs, eh..... I will like, those who will bring it, the agent or agencies to do advertisement on television and then the newspapers before they will bring these drugs to our school to be given to the pupils, so that the parents will be informed about it” IDI_33y_Male_CDD_R.

In addition to information sharing and the education of caregivers, the distribution of ALB and MEB for helminthiasis is a vital facilitator of the MDA programme. As its name implies, the school-based programme is implemented within school settings. This makes it possible to reach several school-aged children at once without much difficulty. The programme, being implemented in schools, offers the opportunity for all students to participate. As a result of this initiative, the proportion of students who take the medication is expected to be very high, given the relationship between students and their teachers. There is minimal risk of students refusing to take the medicine.

Understanding the level of health involvement of parents and other caregivers is crucial. For instance, if a medication causes side effects in a child, parents may decide not to allow the child to take it again, especially if it results in additional expenses. Therefore, the free management of medication side effects is considered a facilitator. It must be recognised that CDDs regularly carry out this support free of charge.

“well as said earlier, some may have rashes on their skin, others may have tough skin, others also complain about itchy eyes. So, we tell them that whatever symptoms they may experience, they should tell so that we find ways of resolving the issue by sending them to the health centres. For that one, we do not take money ... If I am not around, we tell them to go to the clinic, and we add that nobody will take their money so they should go without hesitation.... if they do not respond to treatment, the health workers give them referrer note to take to the Nsuta clinic” IDI_50y_Male_CDD_R.

When parents hear that their children are receiving medication at school, they become concerned about the nature of the drugs. As soon as they observe the slightest signs or symptoms, they approach the teachers to ask for explanations. Providing explanations for the abnormal manifestations after taking the medication helps to reassure them.

“a parent came to the school to complain to me that it was the drug that the child has taken which was given the child some issue. But I had to explain to them that some of these little things were expected. they come there very angry. But after discussion with them and telling them that some of these things small-small side effect is expected, most at times erm they will go from the school with a clear mindset because we have explained everything to them” IDI_39y_Male_CDD_U.

Community leaders—or opinion leaders, as they are often called—are key players in the implementation of policies and programs, particularly MDA campaigns. In Ghana, these community leaders, including local traditional and religious figures, have significant

influence over their communities. They can often persuade their communities to either accept or reject a program. Failure to involve them means omitting a critical group of stakeholders in the implementation of MDA programs. Aware of this, the leaders themselves have acknowledged their role and influence within the community.

“...if the leadership in the community says we do not accept this thing, it has a great influence on the community members. So sometimes it works. And that one goes back to alter what I initially said about the social and the cultural factors. Because if someone thinks that the community especially the leadership does not accept the MDA programme, then everyone will follow...” KII_38y_Male_CL_U.

Contrary to what is indicated in the barrier section of these results, the motivation of CDDs is a crucial facilitating factor in mass drug distribution campaigns against helminthiasis and other diseases. During this study, participants often cited elements such as the desire to help their communities as a key motivating factor for their volunteer work. Alongside this, there is also the expectation from the hierarchy, which compels them to carry out their duties unconditionally.

“We do it because we want to help the children in our community. We know that if they are healthy, it helps all of us parents and teachers” IDI_26y_Male_CDD_U.

“It is GHS who asks us to do this, and at the school level, it is the headmasters who instruct us to do this or that ... it's for the good of the children that we do it” IDI_39y_Male_CDD_U.

“As a classroom instructor, whatever is about the children is my own, I do it with all my whole heart” IDI_33y_Male_CDD_R.

Also, it should be noted that despite the lack of bonuses for fixed-term contracts, some individuals genuinely enjoy the work of distributing medicines to children.

“So it [workshop during MDA] has thought me a lot and I have learnt a lot too. Therefore, I am happy doing the work” IDI_50y_Male_CDD_R.

However, it must also be recognised that this “privilege,” as they perceive it, has led them to take on the role of health agent within their families. They believe they now possess some knowledge that can guide them in choosing medication when a child around them falls ill.

“...personally, when we go for a workshop, I learn so many things so right now if one of my nephews is to get sick, I would know the medicine I would give to him to suppress the disease” IDI_50y_Male_CDD_R.

Organisation and delivery of MDA

This section is devoted to the experiences and attitudes of participants regarding the delivery of the MDA programme. Specifically, it focuses on the duties of CDDs during MDA, the criteria for their selection, and both caregivers' and CDDs' experiences with drug reactions in children.

The distribution of medicines to children adds to the already long list of responsibilities for teachers. They take on multiple roles during the MDA period: acting as informants, counsellors to parents, distributors of the medicines, and recorders of data on children who received the drugs. This wide range of tasks, layered on top of their regular teaching duties, becomes quite overwhelming. To manage the workload, some of them seek help from their colleagues. One CDD from a rural area detailed the full scope of these responsibilities during the MDA campaign.

“I am the campaigner, I am the distributor, I am the record keeper, at times I have to ask one or two of my colleagues to help me. But for the whole issue, I think I am in charge of everything, everything that we have to do concerning it, I do it” IDI_39y_Male_CDD_U.

Caregivers have some doubts about the ability of teachers (CDDs) to distribute medicines to children, as they do not see them as health professionals. From their perspective, any form of healthcare service should be provided by professional health workers.

“But when the kids go home telling their parents that my teacher gave me a drug, probably they might not say a nurse, but I think we also as the community would have to get this information to help the parents to understand that these teachers who are giving the drugs in the school have been trained” KII_60y_Male_CL_U.

In addition, the selection of CDDs does not follow any specific, pre-established criteria. The criteria vary from one agent to another.

“We have the CHPS coordinator, she is a woman, so most at times we assist her. Mostly we are good to the school children from primary to J.H.S they know me very well. So, anything that goes on I am always around to help them” IDI_33y_Male_CDD_R.

Parents' non-involvement or relatively low standard of living affects the process of distributing medication to children. Often, children come to school without having eaten breakfast, and taking the medication on an empty stomach frequently causes reactions. This remains a major difficulty faced by CDDs.

"...the problem that we normally get is that mostly they [students] don't eat before they take the drugs. Normally we administer it after the first break. But they will come and tell you that sir I did not get money to buy food so I can take the drug. So, these are the issues that we normally confront them...." IDI_39y_Male_CDD_U.

Some parents have found that the MDA program has contributed to the improvement of their children's health through the distribution of ALB and MEB. At the same time, others focused on the side effects of the medications on their children, which sometimes frighten them.

"Yeah, it's the reaction. It is very good but at times, the way it behaves, normally, at times, we are also afraid of it but it's all the same, yeah" IDI_28y_Female.CG_R.

Conceptual framework has to come right before the discussion chapter precede with this sentence: Factors influencing community perspectives on anti-helminthiasis mass drug administration for school age children are summarized as underlying and triggering factors in [Figure 1](#).

Discussion

Knowledge on helminthiasis

Study participants demonstrated broad and varied knowledge of the causes of helminthiasis. Some caregivers believed that helminthiasis is caused by evil spirits or by consuming sugary foods such as toffees, biscuits, and *kalypo*. This supports the assertion in the conceptual framework that sociocultural factors—including beliefs, religion, and cultural norms—significantly shape participants' health knowledge. In terms of the Health Belief Model (HBM), this suggests a misalignment between caregivers' perceived susceptibility and actual biomedical risk factors. Aniwada et al. (27) also observed that a large proportion of respondents attributed STH infections to sugary food consumption. This finding contradicts WHO's (28) clarification that helminthiasis is primarily caused by poor sanitation and open defecation.

Nevertheless, many caregivers correctly associated helminthiasis with open defecation, aligning their perceived susceptibility and perceived severity more closely with biomedical perspectives. This variation was linked to education level and area of residence, confirming the influence of personal characteristics—such as

education and living environment—on health knowledge, as posited in the conceptual framework. Similarly, CDDs and community leaders had mixed but partially accurate understandings of helminthiasis, often relating it to dirty environments or contaminated soil. These partially accurate beliefs may influence their self-efficacy in promoting MDA.

Regarding symptoms, both caregivers and CDDs identified stomach pain, vomiting, and loss of appetite as common signs of helminthiasis. This alignment with biomedical descriptions enhances perceived severity and supports cues to action—encouraging care-seeking and compliance with MDA. However, alternative interpretations—such as attributing symptoms to spiritual causes—may reduce the perceived benefits of biomedical interventions.

Preventive knowledge was generally more aligned with biomedical understanding. Caregivers associated good hygiene and clean environments with reduced risk, and CDDs reinforced periodic deworming and sanitation as preventive strategies. These reflect stronger perceived benefits and developing self-efficacy, particularly among better-informed community actors. However, alternative beliefs and preferences for herbal or spiritual remedies reveal critical perceived barriers that must be addressed in community engagement strategies.

Community members' perspectives of anti-helminthiasis MDA

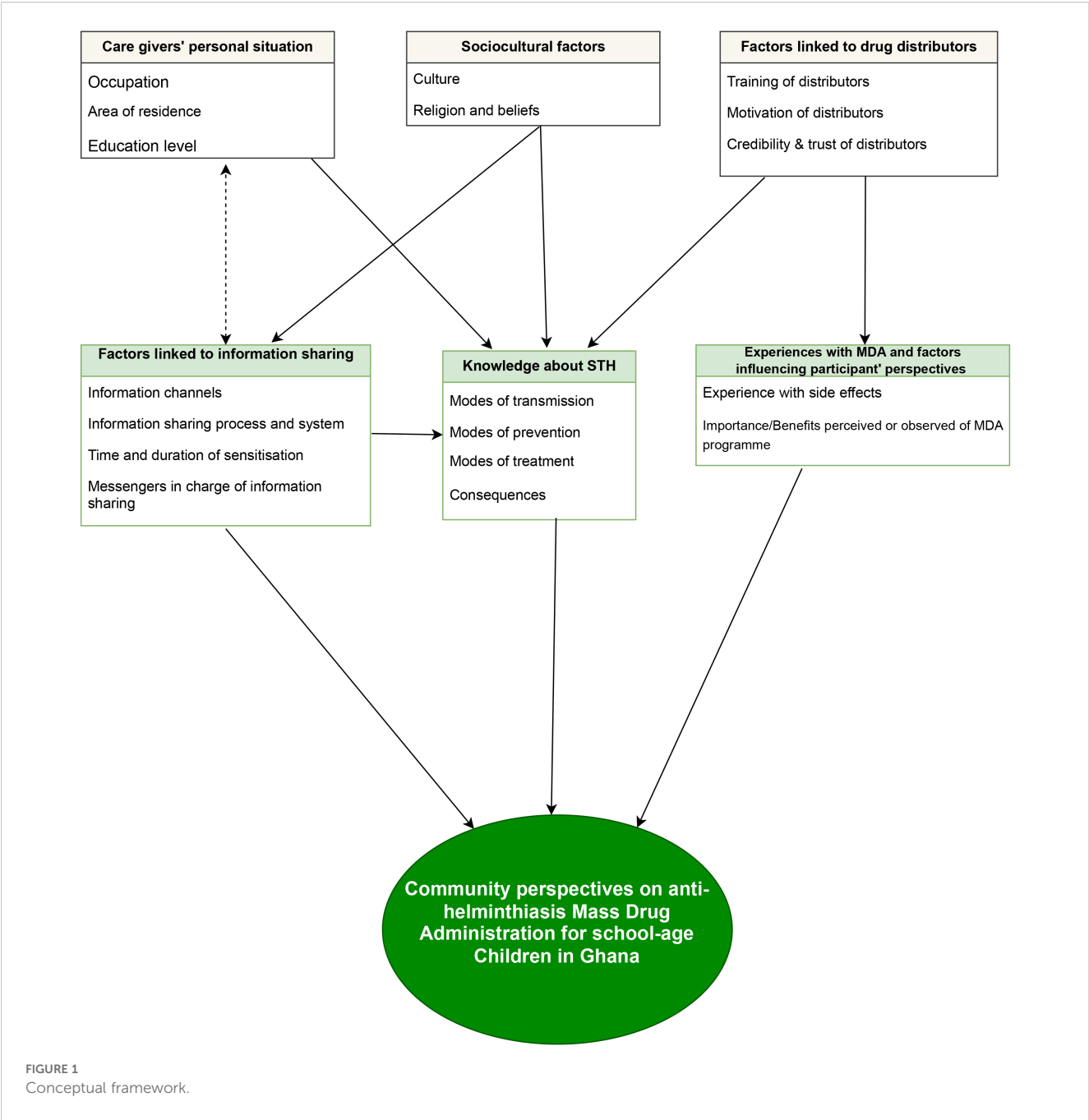
Many participants held favourable perceptions of the MDA programme, viewing it as a beneficial intervention for children, particularly those from less-privileged households. This supports a high perceived benefit of the programme. Caregivers and CDDs alike cited observable improvements in children's health post-MDA, reinforcing cues to action and validating the effectiveness of the intervention. This aligns with WHO (2) and suggests potential for increasing trust and programme uptake.

However, distrust also surfaced. Some participants expressed doubts about the drugs' efficacy, while others feared hidden agendas involving population control or Western conspiracy. These views represent significant perceived barriers, echoing findings from Kusi et al. (29). Such barriers are rooted in broader issues of mistrust, lack of transparency, and limited community involvement, which can substantially hinder the perceived effectiveness of MDA.

Furthermore, the MDA's focus on school-aged children created a perception of exclusion among non-school-going children. This perceived inequity—though rooted in logistical and funding limitations—undermines the perceived benefits and fairness of the intervention.

Experience with MDA and factors influencing participants' perspectives

Barriers to MDA participation were consistently reported. Most notably, poor communication between health workers and community members diminished cues to action. Wanzira et al.



(30) observed similar patterns, emphasising the importance of timely and culturally appropriate communication. The exclusion of parents from MDA sensitisation efforts weakened community ownership and reduced their self-efficacy in health-related decision-making.

Adverse drug reactions—including dizziness, vomiting, and skin rashes—were frequently cited as deterrents. These experiences increased perceived barriers and may discourage future participation. Without adequate pre-distribution education and post-distribution care, such side effects fuel mistrust and misinformation.

Low motivation among CDDs, stemming from a lack of financial or in-kind incentives, also emerged as a critical issue. This affects their self-efficacy and weakens the execution of MDA

activities. Similar findings were reported by Kusi et al. (29), where inadequate incentives were found to undermine the success of community health initiatives.

Critical assessment of the conceptual framework and emerging themes

The study reveals both strengths and limitations in the conceptual framework employed. While the framework successfully anticipated the of sociocultural beliefs, personal characteristics, and factors related to CDDs in shaping health knowledge and behaviour, it did not fully account for several emerging themes.

Notably, the framework insufficiently addressed community mistrust, which emerged as a major perceived barrier across all respondent groups. Although sociocultural beliefs were considered, a more explicit focus on institutional trust and the historical relationship between communities and the health system would strengthen the framework.

Additionally, the framework did not explicitly include cues to action, a core construct of the HBM. Findings from this study underscore the need for consistent, community-driven sensitisation and follow-up communication to trigger timely uptake of MDA.

Self-efficacy—though somewhat implied under CDD motivation and training—also warrants more direct attention. Both the capacity of CDDs to effectively perform their roles and caregivers' confidence in engaging with the health system hinge on this construct.

Integrating HBM constructs more explicitly into the analysis provides a nuanced understanding of how knowledge, beliefs, and contextual factors interact to influence MDA participation. The conceptual framework should be revised to explicitly include institutional trust and structural constraints. These additions would enhance its explanatory power and better inform targeted, culturally resonant interventions for helminthiasis control.

Study limitations and strengths

This study, like all others, has its limitations. The first limitation is that the MDA helminthiasis programme is conducted annually. As a result, recall bias may have occurred, as respondents had to reflect on their perspectives and knowledge of the programme months after the last campaign. Second, programme managers and other health authorities in the district were not interviewed due to time constraints, so their opinions were not included. However, the study does consider the views of key community-level actors involved in implementing the programme—namely, mass drug distributors, caregivers, and community leaders. Lastly, the study was conducted in only one health district within a short time frame, which limits the generalizability of the findings. Nonetheless, it offers valuable insight into community perspectives by identifying barriers and facilitators relevant to MDA campaigns in this district and others with similar characteristics.

Conclusion

The results of this study highlighted the different levels of knowledge among participants regarding STH infections. Among them, few had a good knowledge of STH infections, particularly the causes and/or modes of transmission, symptoms, and choice of treatment route in case of infections. Some participants attributed the causes of STH to eating habits—such as consuming sweet foods—and to the transmission of parasites by flies, and believed that these infections could be treated using herbs and decoctions, even referencing teachings of the Bible where all knowledge is described. It should also be noted that some participants listed causes or modes

of transmission recognised by modern medicine, such as open defecation, walking barefoot, and eating unhygienic foodstuffs. Notably, there are some CDDs who encourage the use of traditional medicine instead of modern medicine. Even more concerning, some participants believed these infections could be prevented through prayer.

Some participants applauded the program and recognised its health benefits for children. On the other hand, others argued that drug distribution programs are a way for the government to make money in collaboration with Western partners who want to control Africans' fertility or poison them through the distribution of free, expired drugs.

The implementation of the MDA program has been hampered by several factors, including the lack of sufficient information about the program, the failure to announce MDA days in advance, the absence of parental consent before administering drugs to children, and its implementation specifically in schools. On the other hand, it was noted that the lack of motivation among CDDs, along with their perception by communities as intruders acting as health agents—without proper mandate or professionalism—also hinders implementation. However, the effective involvement of local authorities and traditional leaders, and proper sharing of information about the program, would help minimise these challenges. It is essential to assume that each community engagement effort is a fresh opportunity, necessitating repeated education and sensitization.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material. Further inquiries can be directed to the corresponding author.

Ethics statement

The study was approved by the Ghana Health Service Ethics Review Board with approval number GHS ERC 070.03.20, and formal permission was sought at the Regional Health Directorate and the District Health Directorate office of Sekyere Central District before the field data collection. Each participant consented to participate and be cited anonymously for write-up (thesis and peer-reviewed article). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

LB: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. NA: Formal analysis, Writing – original draft, Writing – review & editing.

SS: Writing – original draft, Writing – review & editing. AD: Writing – original draft, Writing – review & editing. PD-G: Conceptualization, Data curation, Formal analysis, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing, Project administration, Software.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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