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Factors associated with the prevalence of intestinal soil-transmitted helminth infections among children under 10 years attending Kabanga Health Centre III in Mukono district. A cross-sectional study.

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Abstract

Background
Intestinal soil-transmitted helminth (STH) infections continue to pose a major public health challenge among children under 10 years in resource-limited settings. This study examined the prevalence and related socio-demographic, environmental, and behavioral factors affecting STH infections among children attending Kabanga Health Centre III in Mukono District, Uganda.

Methods
A cross-sectional study of 257 children under 10 collected data via questionnaires, observations, and lab records. Variables included age, sex, parental education, water, sanitation, and hygiene practices. Prevalence was calculated and findings interpreted through descriptive and comparative analyses.

Results
The overall STH infection prevalence was 25.7%, highest among children 4–7 years (32.1%) and males (33%). Children of uneducated parents had the highest burden (66.7%), showing a strong link between parental education and child health. Socioeconomic activities like farming and fishing increased exposure. Water and hygiene practices were poor: only 26% boiled water, 74% treated water inconsistently, and 81% lacked soap. Sanitation was poor, with 27% practicing open defecation and only 23% using improved latrines. Food hygiene was inadequate: 38% ate unwashed raw fruits or salads, increasing exposure risks.

Conclusion
STH infections in Kabanga are moderately common, with risk factors deeply tied to social and economic disparities, poor hygiene infrastructure, and behavioral habits. Despite deworming programs, reinfection remains frequent due to ongoing environmental exposure and lack of sanitation. Tackling these issues through combined WASH initiatives, health education, and policy changes is essential for effective STH control.

Recommendations
Multisectoral approaches are essential to improve latrine access, promote safe water treatment, and establish handwashing facilities with soap. Community awareness and regular deworming every six months should be reinforced. At the policy level, WASH components must be integrated into school and health center-based deworming programs, with ongoing monitoring of sanitation coverage at the sub-county level.

Keywords: *Intestinal helminths, Soil-transmitted helminths, Children under 10 years, Kabanga Health Centre III, Mukono District*
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Background

Helminthiasis refers to infections caused by parasitic worms, which include cestodes (tapeworms), trematodes (flukes), and nematodes (roundworms). These parasites have affected humans since prehistoric periods and continue to impose a heavy burden on health, education, economic productivity, and social development, particularly among disadvantaged populations in underdeveloped regions (Degarege et al., 2022).

Globally, over 1.5 billion individuals are infected with soil-transmitted helminths (STH), such as *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworms (*Necator americanus* and *Ancylostoma* spp.), with the highest prevalence in Asian, African, and Latin American countries (Rahimi et al., 2023). A cross-sectional investigation carried out in Kandahar, Afghanistan, between May and December 2022, examined stool samples from schoolchildren aged 6 to 12 years using saline wet mount and Kato-Katz methods. Statistical analyses, including descriptive statistics, Chi-square tests, and logistic regression, were applied (Rahimi et al., 2023). The study involved 1,275 pupils from eight schools, with a mean age of 8.3 years and a slight predominance of males (53.3%). Findings revealed a high rate of intestinal parasitic infections (68.4%) and STH infections (39.1%), with *Ascaris lumbricoides* being the most prevalent species (29.4%). The mean intensity of infection was 97.8. Major risk factors identified included walking barefoot, poor handwashing practices, untrimmed fingernails, and low family income (Rahimi et al., 2023).

Soil-transmitted helminths such as *Ascaris lumbricoides*, hookworms, and *Trichuris trichiura* remain a leading cause of intestinal parasite infections (IPIs) in low- and middle-income countries (Tinkitina et al., 2024). These infections, particularly among children, are a major public health concern as they contribute to anemia, impaired growth, and delayed cognitive development (Tinkitina et al., 2024). Transmission often occurs through ingestion of infective stages present in contaminated soil, raw vegetables, fruits, or via unclean hands (Chopra et al., 2022). By depleting nutrients and damaging host tissues and organs, these parasites can cause abdominal pain, diarrhea, intestinal blockage, anemia, ulcers, and long-term developmental challenges (Fauziah, Aviani, et al., 2022).

The most frequently detected parasite was *Ascaris lumbricoides* (19.6%), followed by *Trichuris trichiura* (2.18%), *Hymenolepis nana* (0.99%), tapeworms (0.19%), hookworms (0.09%), *Strongyloides stercoralis* (0.09%), and *Enterobius vermicularis* (0.09%). Mixed infections were also observed, such as *A. lumbricoides* with *T. trichiura* (1.08%), *T. trichiura* with *E. vermicularis* (0.09%), and *T. trichiura* with *S. stercoralis* (0.09%). Antihelminthic medications were given to individuals testing positive for these infections (Singh et al., 2004).

Although affordable antihelminthic drugs are available, their effectiveness is limited by poor sanitation, lack of safe water, inadequate waste disposal systems, and favorable environmental conditions that sustain parasite transmission in Africa (Mudavanhu et al., 2024). This highlights that intestinal helminth infections remain a major public health issue, not only among school-going children but also among those of preschool age (Edoa et al., 2024).

Helminth infections are classified among neglected tropical diseases (NTDs), which disproportionately affect populations in impoverished areas of the world (Neglected Tropical Diseases, n.d.). They are a significant public health challenge, particularly in Africa, where most countries—including those in East Africa—lie within the tropics and are highly endemic for these infections (Specht & Keiser, 2023).

Based on this background, the present study seeks to identify the factors influencing the prevalence of intestinal soil helminth infections among children under 10 years attending Kabanga Health Centre III.

Methodology

Study design

A cross-sectional study design was employed, involving sample collection from children (patients) presenting with signs and symptoms of intestinal soil helminths. This study design allowed for the examination of the prevalence and characteristics of intestinal soil helminths in the target population at a specific point in time. Informed consent was obtained from participants or their guardians before sample collection.

Study area

This study was carried out at Kabanga Health Centre III, Mukono district. Kabanga Health Centre III is a government Health Centre III located approximately 28.2 kilometres by road, south of Mukono town. The health centre served a peri-urban and rural population and offered specialized services including an emergency department, outpatients' department, general surgery, internal medicine, maternity services, and many others.

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Study population

All children below 10 years who attended Kabanga Health Centre III at the time of data collection were included in the study.

Sample size determination

Sample size was determined using the formula given by Kish and Leslie (1965):

$$= \frac{Z^2 PQ}{d^2}$$

Where:

z = standard normal deviation set at 1.96, which corresponds to a 96% confidence level.

p = population proportion assumed to be 21.2% (Tinkitina et al., 2024).

q = the difference (1-p) =1-0.212.

d= the standard allowable error, usually set at 5% in this study, that is to say equivalent to 0.05

$$n = \frac{(1.96x1.96)\ x\ 0.212x\ (1-0.212)}{(0.05)x(0.05)}$$

n=256.7

Therefore, the sample size will be 257.

Inclusion criteria

All children below 10 years presenting with signs and symptoms of intestinal soil helminthiasis, accompanied by their parents/guardians attending Kabanga Health Centre III, who consented to participate, were included in the study.

Sampling technique

The selection of participants involved the use of convenience sampling. The primary reason was the children's accessibility (Andrade, 2021). Convenience sampling is a non-probability sampling technique in which the researcher selects the sample based on ease of access. It alluded to a sampling technique independent of chance. Selecting samples that were simple for the researcher to obtain the intended results is known as the convenience sampling technique. This was employed because alternative sampling techniques were difficult or impossible to utilize due to time, money, or other constraints (Andrade, 2021).

Sampling procedure

Parents/guardians of children who presented with the signs and symptoms consented before the administration of the questionnaire and collection of samples for laboratory examination.

Data collection method

Parents/guardians of children who presented with the signs and symptoms were given the questionnaires to fill in on their own. Those who did not know how to read and write were asked the questions verbally from the questionnaire and assisted in filling it out.

Data collection tool(s)

Questionnaires with open-ended questions and laboratory results forms were used as data collection tools.

Data collection procedure

Permission to collect data from Kabanga Health Centre III and the patients (children) who were identified by the doctors presenting with signs and symptoms of helminthiasis was obtained. These children were recruited after consenting to participate in the study. Parents/guardians were then provided with the questionnaires, after which they were sent to the laboratory for stool sample collection and examination. Wet preparation was done to investigate the presence of different diagnostic forms (e.g., ova, cysts, mature parasites, etc.) of the helminths. For proper record keeping, results for the participants were documented.

Study variables

In this study, the factors associated with the prevalence of intestinal soil helminths were the independent variables, and the prevalence of intestinal soil helminths was the dependent variable.

Piloting of the study

Pretesting of the research tools was done at Nsambya Hospital to quality-control their validity and consistency before using them at the study site.

Quality control

All the laboratory procedures were performed following the standard operating procedures. Stool was collected in clean screw-capped containers and examined immediately. Samples were labeled with appropriate identification

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numbers. Stool samples were re-examined by senior staff to quality-control and confirm the results obtained by the researcher.

Data analysis and presentation

Data collected were entered into Microsoft Excel worksheets, exported, and presented in the form of pie charts, tables, bar graphs, and percentages.

Ethical approval

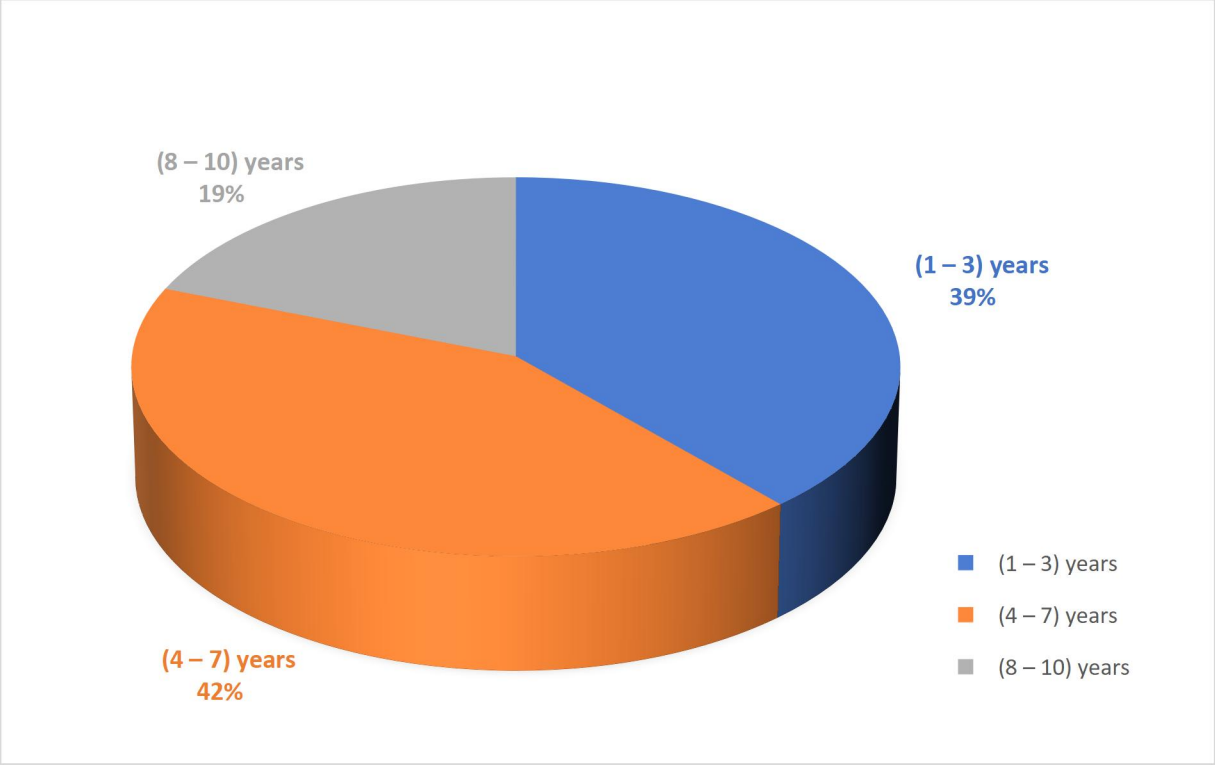
A copy of the proposal was submitted to the University of Kisubi, from where an introductory letter was obtained to be presented to the person in charge of Kabanga Health Centre III, from where permission was sought to carry out the study.

Privacy during the interview was highly observed, and confidentiality of the patient's results was highly ensured because during the study, identification numbers were used.

Results

Socio-demographic characteristics

Figure 1:Age distribution of the respondents. (N=257)



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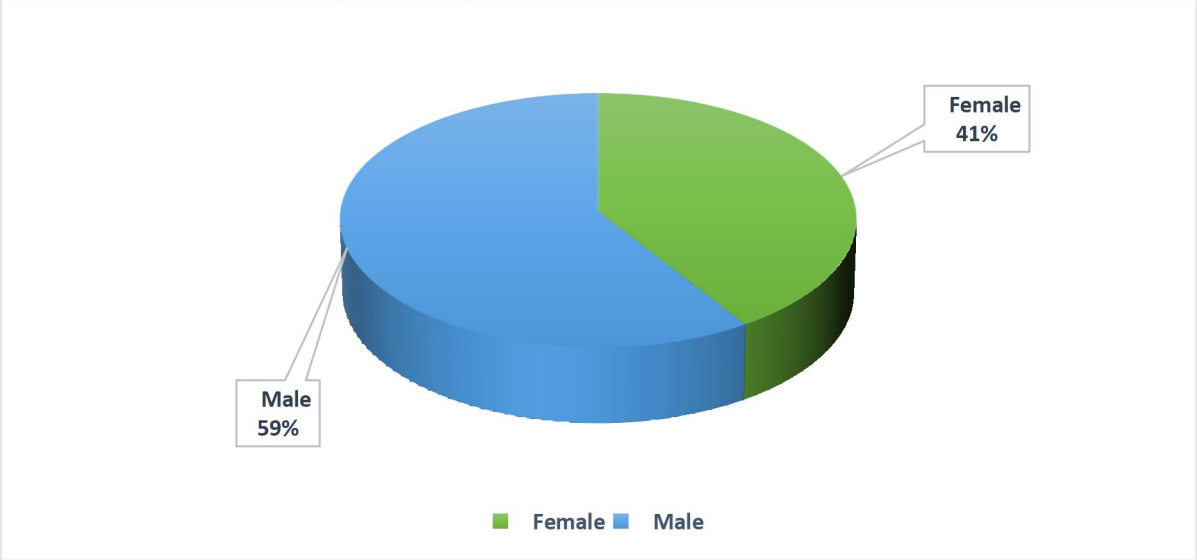
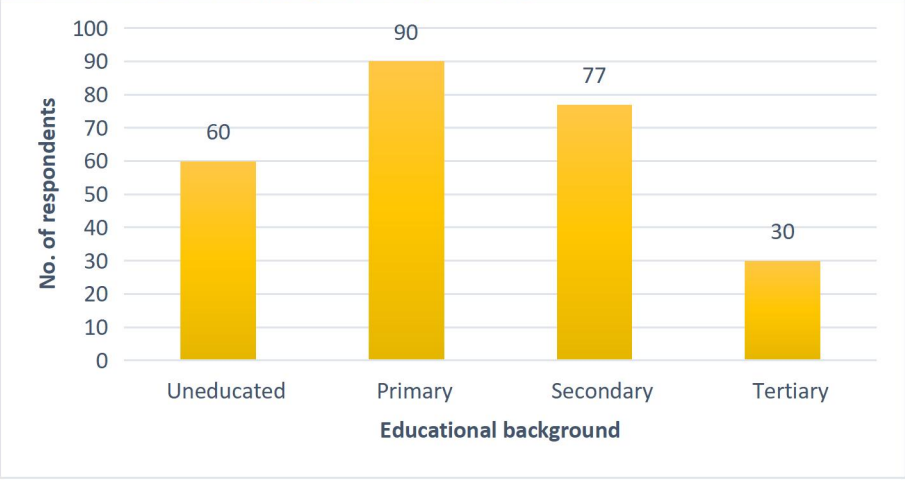
Out of 257 respondents in the study, the majority were between 4-7 years old (42.4%), followed by 1- 3years (38.5%), and the minority were between the ages of 8 -10 years (19%).

Figure 2: Gender of the respondents (N=257)



The majority of the respondents were male (59%), and a minority were female with 41%.

Figure 3: Parental educational background. (N=257)



The majority of the parents had a primary level of education, 90/257(35%), followed by secondary, 77/257 (30%), uneducated, 60/257(23%), and a few parents who had a tertiary level of education, 30/257(12%).

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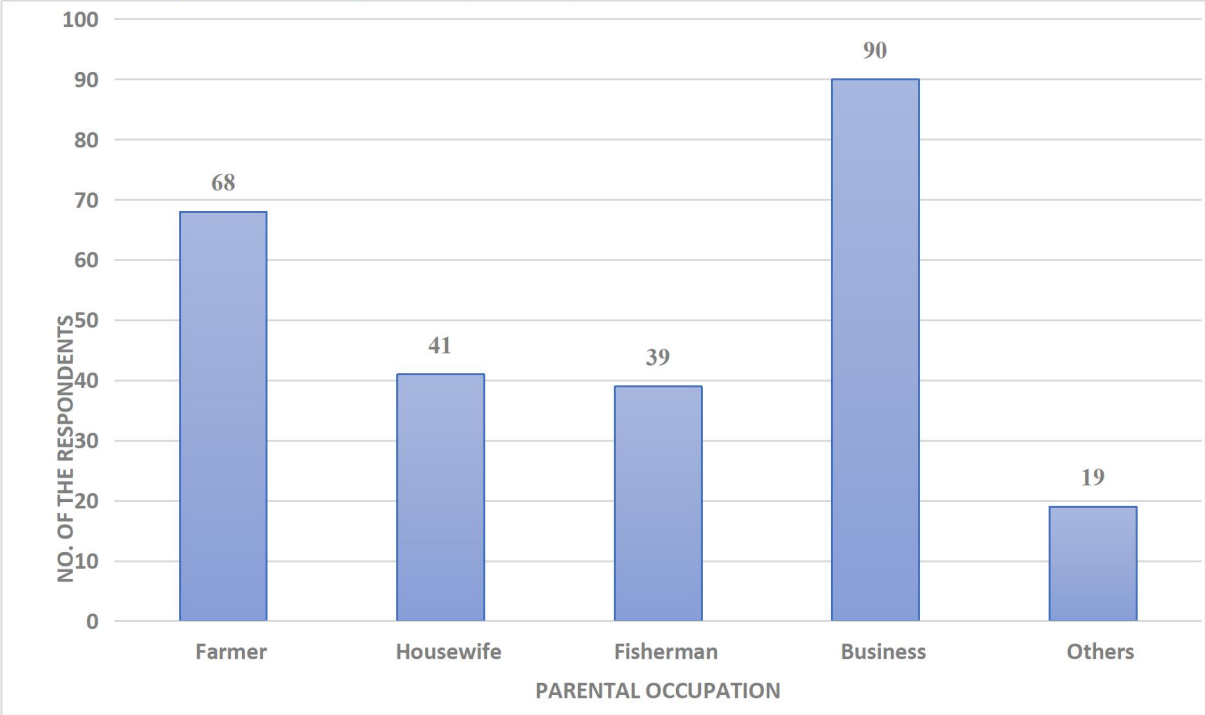
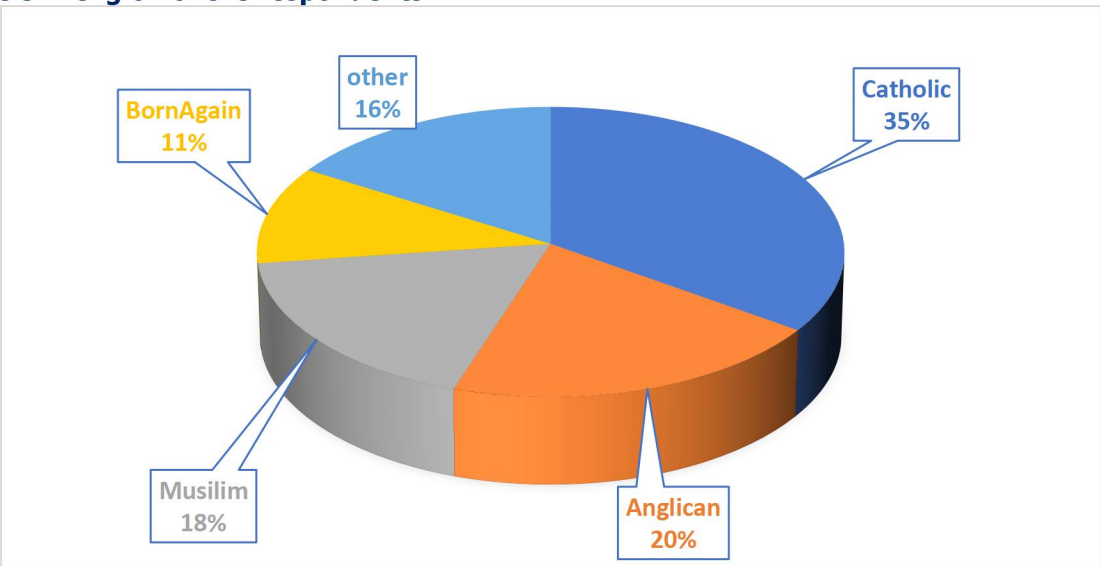
Figure 4: Occupation of the parents (N=257)



Out of 257 respondents, most of them are business people (35%), followed by peasant farmers (26.5%), house wife 16%, fishermen 15% and a few others who do not have a specific occupation (7%)

Figure 5: Religion of the respondents



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Out of 257 respondents in the study, the majority are catholic (35%), followed by Anglican (20%), Muslim (18%), others (16%), and fewer Born Again (11%).

Table 1: Shows the relation between socio-demographic characteristics

Variable	Category	Frequency (N = 257)	Children infected with soil intestinal helminths	
			Yes (n=66)	No (n=191)
Age Group (years)	1 – 3	99 (38.5%)	19 (20%)	80 (80%)
	4 – 7	109 (42.4%)	35 (32%)	74 (68)
	8 – 10	49 (19.1%)	12 (24%)	37 (76%)
Gender	Female	105 (40.9%)	16 (15%)	89 (85%)
	Male	152 (59.1%)	50 (33%)	102 (67%)
Religion	Catholic	86 (33%)	15 (17.4%)	71 (82.6%)
	Anglican	50 (19%)	12 (24%)	38 (76%)
	Muslim	44 (17%)	17 (38.6%)	27 (61.4%)
	Born Again	27 (11%)	9 (33.3%)	18(66.7%)
	other	50 (19.6%)	13 (26%)	37(74%)
Parents' level of Education	Uneducated	6 (2.3%)	4 (66.7%)	2 (33.3%)
	Primary	26 (10.1%)	8 (30.8%)	18 (69.2%)
	Secondary	129 (50.2%)	32 (24.8%)	97 (75.2%)
	Tertiary	96 (37.4%)	22 (22.9%)	74 (77.1%)
Parent's Occupation	Farmer	68 (26.5%)	20 (24.4%)	48 (70.6%)
	Housewife	41 (15.9%)	10 (24.4%)	31 (75.6%)
	Fisher	39 (15.2%)	12 (30.8%)	27 (69.2)
	Business	90 (35%)	20 (22.2%)	70 (77.8%)
	Others	19 (7.4%)	4 (21.1%)	15 (78.9%)

The study population was predominantly male, with 152 (59.1%) participants being male and 105 (40.9%) female. 50 (32.9%) of the males were infected, while 16 (15.2%) of the females were infected.

Children aged 1-3 years constituted 99 (38.5%) of the total study population. Among this group, 19 (19.2%) children were infected. The 4-7 years age group formed the largest segment of the study population, accounting for 109 (42.4%) of the participants. This group also exhibited the highest contribution to the overall prevalence, with 35 (32.1%) children infected. The smallest age group was 8-10 years, comprising 49 (19.1%) of the participants. Within this group, 12 (24.5%) children were infected.

Of the 257 children, 6 (2.3%) had uneducated parents, with 4 (66.7%) of their children infected. Among children with parents having primary education, 8 (30.8%) were infected. For those with parents having secondary education, 32 (24.8%) were infected. The group with tertiary-educated parents had 22 (22.9%) infected children.

Among 68 children whose parents were farmers, 20 (29.4%) were infected. For those with housewives as parents, 10 (24.4%) were infected. Children of fishers showed 12 (30.8%) infected, children of business owners 90 formed the largest group and had 20 (22.2%) of them infected. For children with parents in other occupations, 4 (21.1%) were infected.

Social-economic factors and behavioral factors associated with the prevalence of intestinal soil helminthes infections among children below 10 years attending Kabanga Health Centre III.

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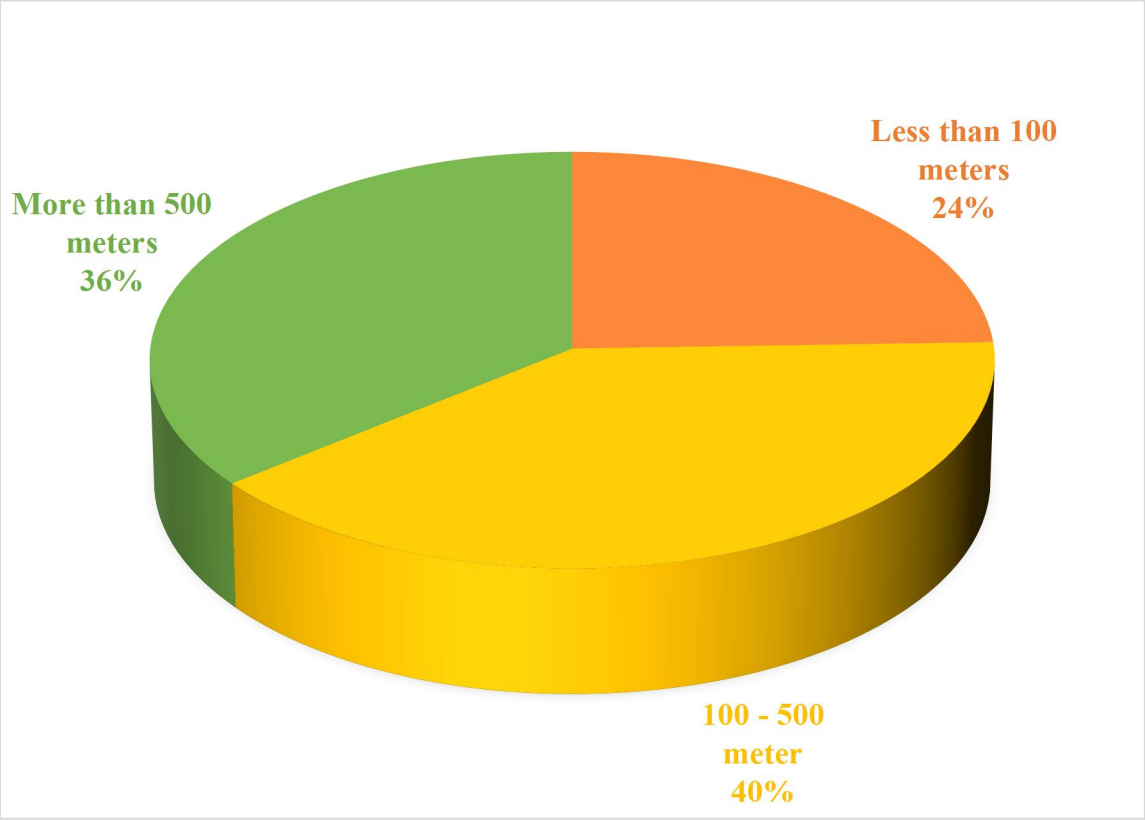
Table 2: Shows the number of respondents who drink boiled water and wash their hands before eating food, N=257

Response	Number of respondents	Percentage (%)
Drink boiled water at home.		
Always	68	26
Rarely	102	40
No	87	34
Total	*257*	*100*
Wash your hands before eating food.		
Yes	170	66
Rarely	60	23
No.	27	11
Total	*257*	*100*

Most of the respondents in the study rarely (40%) drink boiled water, 34% do not drink boiled water, and a few always (26%) drink boiled water.

Figure 6: Distance from the water source



Out of the 257 respondents in the study, the majority 40% have about 100 – 500m distance from the water source, 36% had more than 500m, and 24% of the respondents had less than 100m from the water source to their household.

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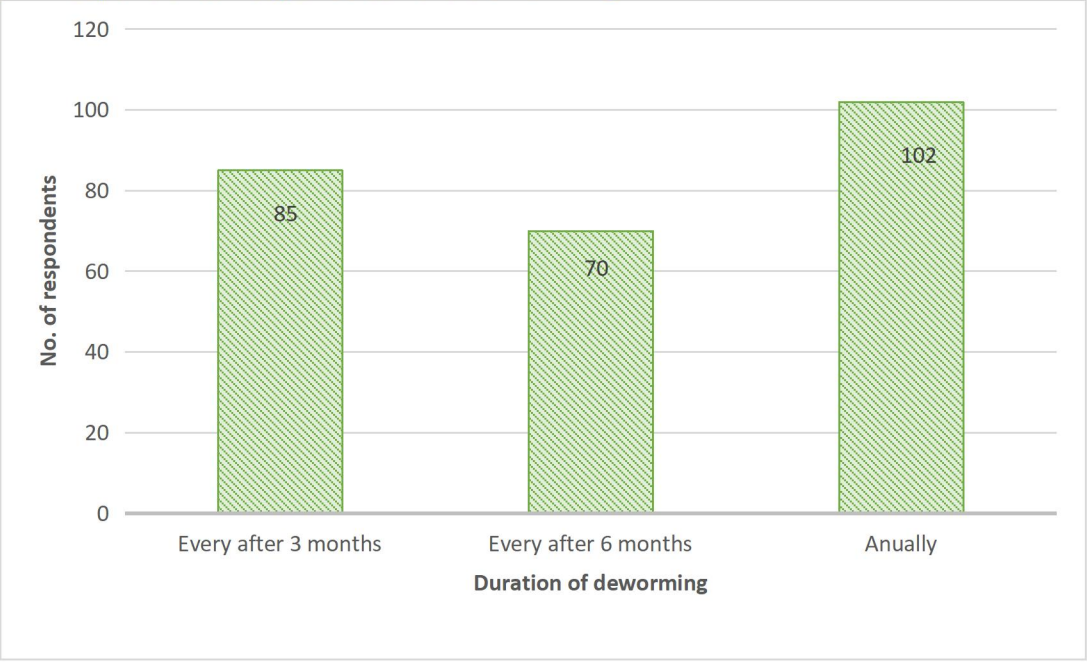
Table 3: Shows respondents' water treatment and how they treat it for drinking.

Respondents	Number of respondents	Percentage
Treat water before use.		
Yes	192	74
No	65	26
Total	*257*	*100*
If yes, how do you treat it?		
Boiling	86	45
Filtering	50	26
Use of chlorine tablets	18	9
Letting it settle	30	16
other	08	4
Total	*192*	*100*

The majority of the respondents said they treat water (74%) be use, while a minority said they do not normally treat water (26%) before use.
Out of the 192 respondent who said they treat water before use, most of the households 45% boiled water, 26% filtered water, 16% let the water settle, 9% used chlorine to treat their water, and 4% used other methods for treating their water for domestic use.

Figure 7: Respondents' response toward deworming



Most of the respondent said they normally deworm their children annually (39%), every after 3 months (33%), and every after 6 months (27%).

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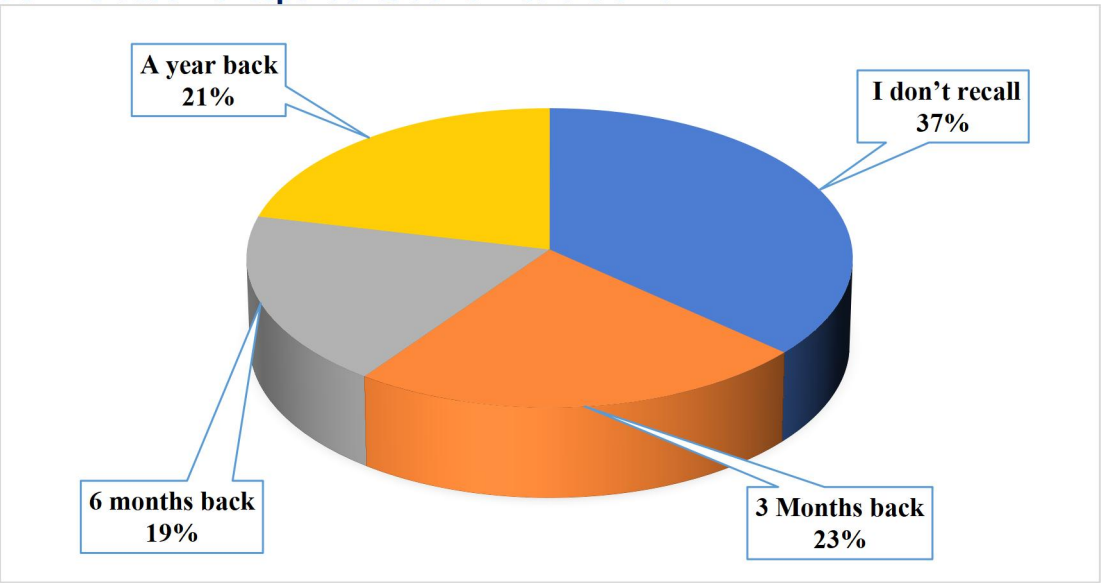
Figure 8: The last time respondents dewormed the child.



The majority of the respondents (37%) do not recall the last time they dewormed their children, 23% said 3 months back, 21% a year back, and 19% said they dewormed their children 6 months back.

Table 4: Shows the number who eat washed raw fruit/raw salads and where they fetch water for domestic use.

Response	Frequency	Percentages (%)
Do you eat washed raw fruits/salads?		
Yes	160	62
No	97	38
Total	257	100
Where do you fetch water for home use?		
Tap water	40	16
Borehole water	60	23
Open well	80	31
Lake water	30	12
Stream water/swarm water	47	18
Total	257	100

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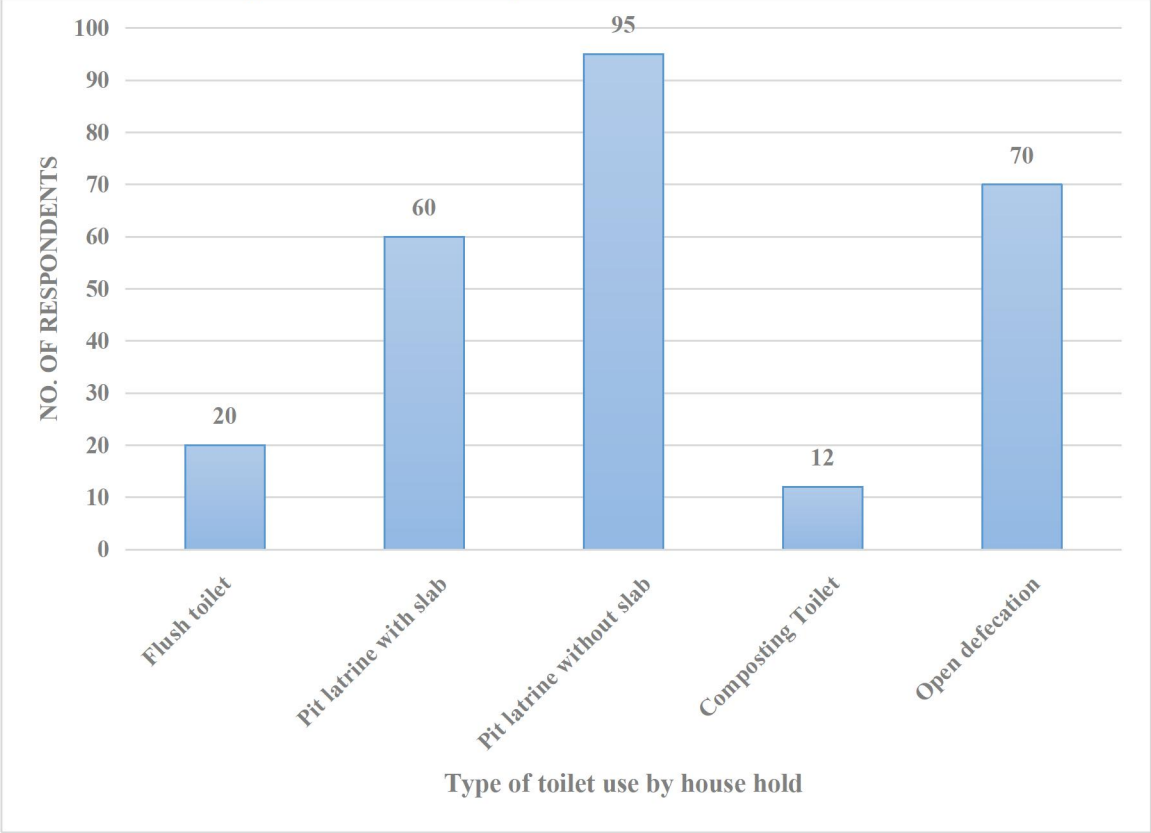
The majority of the respondents 62% eat washed raw fruits/salads, and the minority 38% eat raw fruits/salads without washing/cleaning them.

Out of the 257 respondents in the study, 31% get water from the open well, 23% borehole, 18% from stream/swamp water, 16% tap water, and 12% from the lake.

Figure 9: Shows the type of toilets used by the household



The majority of the respondents 36% use a pit latrine without a slab, 27% open defecation, 23% pit latrine with a slab, 7% flush toilets, and 4% use a composting toilet.

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Table 5: Shows respondents' use of toilets and hygiene.

Response	Frequency	Percentage (%)
shared toilet/pit latrine with other households		
Yes	86	33
No	171	67
Total	*257*	*100*
Location of the toilet/pit latrine		
Inside the house	55	21
In the compound	130	51
Outside the compound	72	28
Total	257	100
Toilet/pit latrine open/ enclosed for privacy		
Yes	162	63
No	95	37
Total	*257*	*100*
Designated handwashing place		
Yes	88	36
No	169	64
Total	*257*	*100*
Availability of water at the handwashing station		
Yes	68	28
No	187	72
Total	*257*	*100*
Soap availability at the handwashing station		
Yes	46	19
No.	209	81
Total	*257*	*100*
Live along the shore of Lake Victoria.		
Yes	144	56
No	113	44
Total	*257*	*100*
Live near the forest.		
Yes	158	61
No	99	39
Total	*257*	*100*

The majority of the respondents 63% have open pit latrines that are not enclosed for privacy, while the minority 27% have enclosed pit latrines for privacy. Most of the respondents 64% do not have a designated handwashing place in their household, and 36% have a designated handwashing place.

There are a lot of respondents 78% have no water available at the handwashing station, and 28% have water available at the handwashing station. Meanwhile, most of the respondents 81 % don't have soap at the hand washing station, and only 19% have soap at the hand washing station.

The majority of the respondents 56% stay live along the shore of Lake Victoria, and 44% do not live along the shore of Lake Victoria. Similarly, most respondents live near the forest area, and 39% do not live near the forested area.

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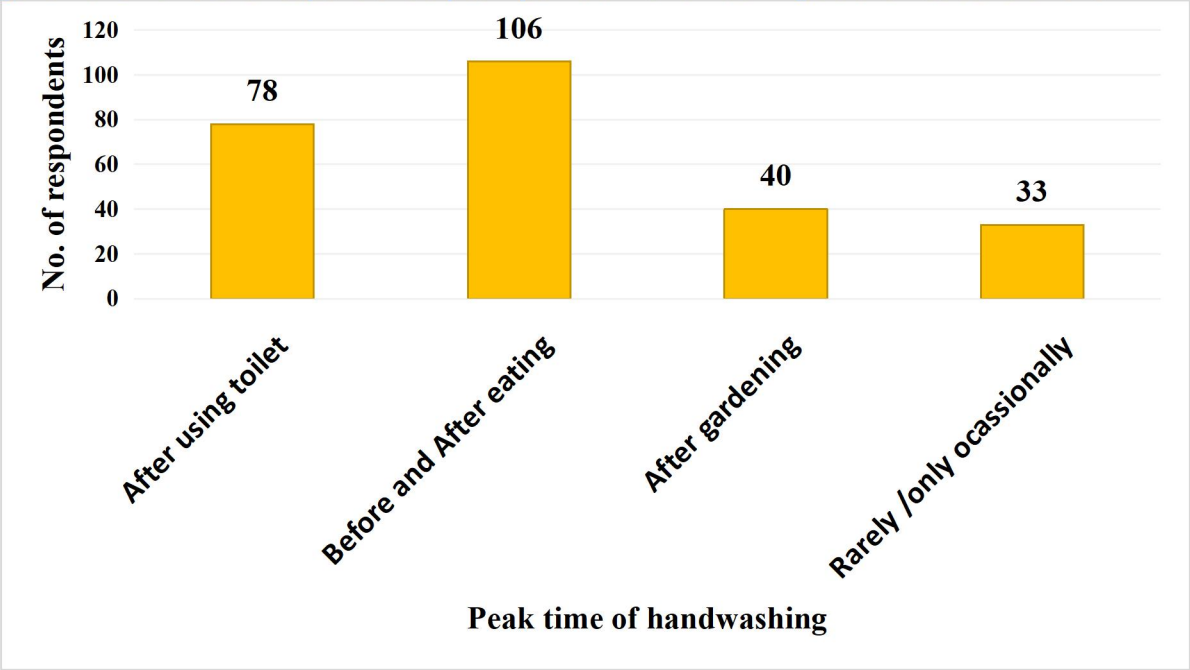
Figure 10: Shows the respondent's peak point of handwashing at the household level



Most of the respondent 41% wash their hand before and after eating, 30% after using the toilet, 15% after gardening, and 13% rarely/occasionally wash their hand.

Discussions

Socio-demographic characteristics

Of the 257 children assessed, those aged 4–7 years represented the largest proportion (42.4%) and recorded the highest rate of STH infection (32.1%). This age bracket is particularly at risk due to frequent play in contaminated soil, underdeveloped hygiene practices, and limited parental supervision. Children aged 1–3 years showed a relatively lower prevalence (19.2%), though still significant given their weaker immunity and the possible long-term developmental consequences of early exposure to helminths. For the 8–10-year group, the prevalence was 24.5%, which may reflect cumulative exposure, though slightly reduced by improved hygiene awareness and more independent handwashing practices.

These age-related patterns mirror findings from previous studies. Tinkitina et al. (2023) and Ojja et al. (2018) also noted that children between 4 and 8 years were most vulnerable, mainly because of poor WASH practices and unsupervised outdoor activities.

Gender differences were also observed, with boys recording a prevalence of 33% compared to 15% in girls. This disparity is likely linked to behavior, as boys are more likely to play outdoors barefoot and less likely to adhere to hygiene practices. Similar trends were reported by Justine et al. (2024) in Tanzania and Ojja et al. (2018) in Uganda, where boys were consistently more exposed due to cultural and social norms around play and labor.

Parental education also influenced infection rates. Children of parents without formal education had the highest prevalence (66.7%), while those whose parents had tertiary education showed the lowest (22.9%). Education enhances awareness of hygiene, promotes participation in deworming campaigns, and encourages the proper use of sanitation facilities. Sartorius et al. (2021) similarly highlighted education as a key determinant in reducing STH transmission.

Occupation further reflected risk variation. Children from fishing (30.8%) and farming households (29.4%) had higher infection rates, likely due to frequent soil and water contact. In contrast, prevalence was lower among children of business owners (22.2%) and those in "other" occupations (21.1%), likely linked to higher socioeconomic status and better living standards. Comparable patterns were reported in rural Kenya and Rwanda, where STH

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infections were commonest in farming and fishing families (Kabatende et al., 2020; Okoyo et al., 2020).

Prevalence of intestinal soil-transmitted helminths among children under 10 years

Out of 257 participants, 66 (25.7%) tested positive for intestinal soil-transmitted helminths, meaning one in four children attending Kabanga Health Centre III had an STH infection. According to WHO guidelines, this level (20–50%) falls within the moderate transmission category, which requires annual mass drug administration (MDA) for at-risk children (WHO, 2023).

The highest prevalence occurred in the 4–7-year-olds (32.1%), consistent with global trends where children in this age range are more exposed due to active play in contaminated areas and poor hygiene. The 1–3-year-olds had the lowest prevalence (19.2%), reflecting closer supervision and reduced mobility. For 8–10 years, the prevalence was moderate (24.5%), possibly due to improved hygiene knowledge, but continued risk from exposure. Similar patterns were observed by Tinkitina et al. (2023) in central Uganda and Sacolo-Gwebu et al. (2019) in South Africa, who identified mid-childhood as a critical infection period.

Boys (33%) were more than twice as likely to be infected compared to girls (15%), echoing findings from Tanzania (Justine et al., 2024) and Hoima, Uganda (Ojja et al., 2018). This gender gap likely arises from outdoor barefoot activities and reduced compliance with hygiene practices among boys.

The prevalence of 25.7% in Kabanga is higher than urban settings like Kampala (10–15%) but lower than eastern Uganda, where rates often exceed 40% in areas with intensive agriculture and poor sanitation. Regionally, WHO (2023) estimates that more than 267 million children in Sub-Saharan Africa are at risk due to inadequate sanitation and unsafe water.

Socio-economic and behavioral factors

Only 26% of households consistently boiled drinking water—the most reliable way to destroy STH eggs and pathogens—while the majority (74%) rarely or never treated water. This exposes children to *Ascaris lumbricoides* and *Trichuris trichiura*. WHO (2023) and Alemayehu et al. (2025) stress that untreated water perpetuates infections, while studies in Uganda (Kabatende et al., 2020) confirmed boiling as highly protective.

Although 66% of households reported handwashing before meals, only 19% had soap, raising doubts about effectiveness. Curtis and Cairncross (2003) estimated that proper handwashing with soap could cut diarrheal and parasitic infections by over 40%, but in this setting, limited soap availability reduces impact.

Access to water was another barrier—76% of households were located over 100 meters from water points. This distance discouraged regular use, particularly for hygiene activities like handwashing, leading to unsafe water conservation and reuse, which heightens infection risk.

While 74% reported treating water, only 45% boiled it, with others relying on settling or filtering, which are inadequate against helminth eggs. Okoyo et al. (2020) in Kenya observed high reinfection rates in households using such ineffective methods after deworming campaigns.

Although most families reported deworming practices, irregular schedules, and poor recall suggest gaps in community health education. WHO recommends biannual treatment in high-prevalence areas, but over a third of caregivers could not recall the last deworming. This weakens MDA effectiveness, particularly in peri-urban districts like Mukono.

Dietary habits also contributed—about 40% of children ate unwashed raw produce, posing a direct risk of ingesting helminth eggs. Gebru et al. (2023) highlighted food hygiene as an overlooked but crucial factor in STH control.

Most households relied on unsafe sources such as open wells (31%) and streams/lakes (30%), with only 16% using piped water. Such sources are prone to fecal contamination from runoff and animals. WHO & UNICEF (2021) identify these as unimproved water sources, and Karagiannis-Voules et al. (2015) linked them to persistent endemicity across rural Uganda.

Environmental and sanitation factors

Consistent and effective water treatment was rare—only 26% always boiled water, while 34% never treated it at all. Although 74% reported some treatment, most used inadequate methods such as filtering (26%) or settling (16%), leaving children exposed. Alemayehu et al. (2025) stressed that only regular and effective treatment significantly reduces exposure.

Sanitation facilities were also inadequate: 36% of households used pit latrines without slabs, and 27% practiced open defecation. Furthermore, 37% of toilets lacked enclosures, discouraging use due to a lack of privacy, especially for females. Karagiannis-Voules et al. (2015) identified open defecation as the strongest predictor of STH endemicity in Sub-Saharan Africa.

While 66% reported washing hands before meals, only 28% had water at designated handwashing stations, and

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64% lacked such facilities altogether. Soap was available in only 19% of households. Sacolo-Gwebu et al. (2019) emphasized that infrastructure and resources are stronger predictors of reduced infection than self-reported hygiene.
Nearly 40% of children ate raw fruits or vegetables without washing, further contributing to infection risk. Alemayehu et al. (2025) also identified poor food hygiene as a major pathway of STH transmission, especially in rural farming households.
Environmental factors also played a role—56% of households were near Lake Victoria, and 61% were close to forested areas. These conditions, associated with poor drainage and sanitation, heighten soil contamination. Tinkitina et al. (2023) linked proximity to such ecological zones with persistent transmission across Uganda's Great Lakes region.

Conclusion

This study indicates that intestinal soil-transmitted helminth infections are common among children under 10 years old in Kabanga Health Centre III, with 66 children (25.7%) infected. This means roughly 1 in 4 children under 10 are affected, with a higher burden among children aged 4–7, boys, and those from households with low education and income. Environmental and sanitation factors—especially water source, latrine type, handwashing facilities, and soap availability—play a significant role in the transmission cycle.
Despite widespread deworming efforts, reinfection rates remain high because of ongoing exposure to contaminated environments and poor hygiene habits. Structural and behavioral factors need to be addressed alongside medical interventions to create lasting reductions in STH infections.

Study limitations

During data collection, the socio-demographic data were collected using questionnaires; participants may not give the right information when answering questions regarding hand washing after visiting the toilet and before meals. This may lead to bias. Explain more about the study to make a complete awareness to the respondents the purpose of the study.
The researcher may also face financial hardships during data collection and challenges in explaining the purpose of the study to the respondents, since most / some may think that the researcher is using them to get money; the researcher intends to stick to the budget to solve the financial challenges.

Recommendations

- To promote safe sanitation, the government and NGOs should invest in building affordable pit latrines with slabs and educate families about the dangers of open defecation.
- Improve water access and treatment by promoting the regular boiling of drinking water and expanding access to protected water sources through borehole drilling and treatment campaigns. Hygiene promotion programs initiate community education on hygiene, focusing on handwashing. Critical times (after toilet use, before meals), emphasizing the provision of soap and the construction of handwashing stations.
- Encourage consistent deworming practices, at least every 6 months, and improve record-keeping of the last deworming date.
- Promote food hygiene, especially washing fruits and vegetables before consumption.
- Encourage children to wear shoes, especially when playing outside or in muddy or contaminated areas.
- Integrate WASH (Water, Sanitation, and Hygiene) initiatives with school and health center deworming programs.
- Strengthen health education in schools and clinics on STH transmission and prevention.
- Monitor and evaluate environmental and sanitation risk indicators regularly at the sub-county level.

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List of abbreviations

IPIs: Intestinal Parasitic Infections
NTDs: Neglected Tropical Diseases
Sp.: Species
SSA: Sub-Saharan Africa
STHs: Soil-Transmitted Helminthes
WHO: World Health Organization

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CDC : Center for Disease Control and Prevention

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Conflict of interest

There is no conflict of interest.

Availability of data

Data used in this study are available upon request from the corresponding author.

Author's contribution

FO designed the study, conducted data collection, cleaned and analysed data, and drafted the manuscript. KJ, LF, SV, OBW, PKA, and SS all actively participated in data collection for this study, and HM supervised all stages of the study from conceptualization of the topic to manuscript writing and submission.

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