Advance Research Journal of Medical and Clinical Science
Received: 20 Dec 2020 | Accepted: 05 Jan 2021 | published 11 Jan 2021
ARJMCS 07 (01), 394-407 (2021) | ISSN (O) 2455-3549

Article,

Knowledge, attitude and practice on soil transmitted helminthiasis among pupils in ziwani learning centre, east kisumu location, kisumu county, kenya

Kagoiyo N.S, [1], Kagoiyo S.W[2], Lukorito L.K[3], Obunde M.A *[4]

1. Lecturer, Kirinyaga University, P.O. Box 143-10300, Kerugoya, Kenya,

2. Kirinyaga County Referral Hospital, P.O Box 24-10300, Kerugoya, Kenya,

3. Lecturer, Uzima University College P.O. Box 2502-40100, Kisumu

4.Dpartment of Microbiology, Faculty of Health Sciences, Uzima University College, P.O Box 2502-40100, Kisumu, Kenya

Abstract:

Background: Globally, approximately 1.5 billion people are infected with soil transmitted helminthes and more than half a billion children live in high transmission areas and are in dire need of treatment and control interventions In Kenya, about 15 million people are infected. **Objective:** To evaluate the level of knowledge, attitude and practice of soil transmitted helminthiasis among school children. **Design:** A descriptive cross-sectional study. **Setting:** Ziwani Learning Centre based in Usoma village adjacent to Kisumu International Airport, Kisumu County and also borders Lake Victoria. **Subjects/Participants:** The study population consisted of pupils from Ziwani Learning Centre aged 4- 15 years old. **Results:** The study participants reported relatively poor knowledge, attitude and practice on soil transmitted helminths, at 32%, 39% and 32% respectively. 37 pupils (41%) had never heard about intestinal worms.

Conclusion: The overall KAP reported implies a gap which puts the study population at risk of becoming infected or re- infected with soil transmitted helminths despite the gains made by the NSBDP.

1. INTRODUCTION

Soil transmitted helminths are grouped among the neglected tropical diseases (NTDs), for which the WHO has put in place polices and strategies to reduce morbidity to levels that are not of public health concern. Various resolutions have been made to scale- up efforts to fight NTDs. The aim of the WHO Global Plan to Combat Neglected Tropical Diseases 2008- 2015 was to prevent, control, eliminate or eradicate NTDs. It outlined the challenges in this battle, for example, drug procurement and supply, quantification of the burden of neglected tropical diseases among neglected populations, provision of free medication to those in need, medicine delivery system to cover the entire at- risk population,(WHO, 2007). As a result, various policies and strategies were put in place following which A roadmap for implementation was designed to guide implementation. (World Health Orgnization (WHO) Technical Report Series; 830, 2012). The London Declaration on NTDs (30th January 2012) was inspired by the WHO 2020 Roadmap to eradicate or prevent transmission of NTDs. It was a collaborative disease eradication program that brought together various stakeholders, among them pharmaceutical industries, universities, philanthropists, among them, the World Bank, Pfizer, Novartis, Johnson and Johnson,

GlaxoSmithKline. Several endorsements were made, for example, with regard to STHs, GSK and Johnson and Johnson endorsed supply of 400 million tablets of albendazole and 200 million tablets of mebendazole per year respectively. In 2017, the WHO published Integrating NTDs into Global Health and Development which is a review of the progress made towards achieving the Roadmap targets for 2020, noting the remaining challenges and looking beyond 2020 in consideration of how to integrate NTDs into broader 2030 agenda for sustainable development,(WHO, 2017). The 2001 World Health Assembly endorsed a three- pronged approach to reducing STH- associated morbidity in high transmission areas. This involves case management and preventive chemotherapy for at-risk groups(pre- school age children (PSAC), school age children (SAC), women of reproductive age and adults in high-risk occupations e.g. tea pickers and miners), improved access to safe water and sanitation, as well as improved personal hygiene through health education. The WHO strategy for preventive chemotherapy involves administration of 400 mg of ABZ or 500 mg of MBZ to all at risk people in endemic areas,(WHO, 2012)(WHO, 2005, 2018). In Kenya, the National School Based De-worming Program was initiated in 2009 with the aim of eradicating parasitic worms as a public health problem. The program targeted 28 of the 47 endemic counties and was scheduled to run for 5 years, between 2012-2016, wherein 5 million children would be de-wormed each year, (Ministry of Education Science and Technology, 2014); (Masaku et al., 2017). “More than 1.5 billion people, or 24% of the world’s population, are infected with soil-transmitted helminth infections worldwide,” (WHO, 2018). STH infections are endemic in 166 countries,(Pullan et al., 2014).According to a WHO report, 1221-1472 million cases of ascariasis, 750- 1050 million cases of trichuriasis and 740-1300 million cases of hookworm infestation are reported annually, globally,(WHO, 2012). Prevalence of Strongyloidiasis is as high as 50% in West Africa, the Caribbean, Southeast Asia, tropical regions of Brazil, Cambodia, and temperate regions of Spain. Southeast Asia appears to have the highest endemic percentage, and it is highly prevalent in some tropical aboriginal communities in Australia, (Puthiyakunnon et al., 2014). Most infections occur in regions in which warm, moist climate favors egg and larval development of geohelminths in soil. It follows then that the highest number of infections are found in tropical and subtropical regions of Asia, especially China, India and Southeast Asia, as well as sub-Saharan Africa,(Gordon, Kurscheid et al., 2017; Puthiyakunnon et al., 2014; Tefera et al., 2017). Asia carries 70% of the global burden, with India contributing the most to the global burden, (Jain et al., 2016). STH infections in Australia have been attributed to immigrants from South East Asia where Strongyloides stercolaris is endemic. In Africa, 30.7, 36.5 and 50 million children are infested with Ascaris lumbricoides, Trichuris trichuria and hookworm respectively, (Uzodimma and Ojinaka, 2016). About 198 million people in sub- Saharan Africa are infected with hookworms, 173 million people with ascaris infection, and a further 162 million with trichuriasis, (Sakari et al.,2017).STH infections in Kenya exhibit pattern of wide distribution, (African & Journal, 2016). Approximately 15 million Kenyans are infected with parasitic worms with the highest number of infections occurring in western, south Rift, and the coastal region especially in Kilifi and Kwale, (Standard media, 15th July, 2017).The high humidity in the coastal and Lake basin region favor STH survival,(World Health Organization Regional Office for Africa, 2013). A recent monitoring and evaluation program of the NSBDP between 2012 and 2017 revealed significant reductions in STH prevalence in the Coastal, Western, Nyanza and South Rift. The higher reduction rates in coastal region were attributed to other complimentary intervention strategies,(Mwandawiro et al., 2019). However, rapid re- infection rates were also reported, especially with ascariasis.

Hypothesis:

Ho: 50% of the study participants have knowledge of soil transmitted helminthiasis (μ=0.5).

Ha: Less than 50% of the study participants have knowledge of soil transmitted helminthiasis ($\mu<0.5$).

Ho: 50% of the study participants have the correct attitude about soil transmitted helminthes ($\mu=0.5$)

Ha: Less than 50% of the study participants have the correct attitude about soil transmitted helminthes ($\mu<0.5$).

Ho: 50% of the study participants have hygienic practices that reduce transmission and re-infection by soil transmitted helminthes ($\mu=0.5$).

Ha: Less than 50% of the study participants have hygienic practices that reduce transmission and re-infection by soil transmitted helminthes ($\mu<0.5$).

Significance of the study:

This study aimed to assess pupils' awareness of soil transmitted helminths since children are the most affected population. The data generated will be useful in advocating for awareness creation and evaluating health education in relation to prevention of soil transmitted helminthiasis. This will in turn work to strengthen existing policies for STH control. The study results will further help the Ministry of Health in the planning and implementation of STH control programs. The school and the community at large will equally benefit from interventions that will be prompted by the study, for example, school children will report better school attendance and performance as a result of reduced morbidity due to STHs. On a much broader scale, the socio-economic status of the community and that of the country will improve due to increased productivity of individuals.

Scope and delimitation of the study:

The study involved pupils of Ziwani Learning Centre in East Kisumu Location, aged 4-15 years. Only assenting pupils for whom written consent was given by the head teacher (guardian) were allowed to participate in the study. The survey instrument contained multiple choice questions and left out open- ended questions for easy manageability of the collected data. The study only assessed the KAP of STHs of pupils and did not research on other related variables such as prevalence, iron content, malnutrition etc.

Assumption of the Study:

The study assumed that the pupils have been part of the on- going National School- Based De-worming Program and that participants responded to questions candidly and to the best of their ability.

2. MATERIALS AND METHODS

Study Area: Kisumu County is one of the 47 Counties in Kenya and lies within longitudes 33° 20'E and 35° 20'E and latitudes 0° 20'South and 0° 50'South. The County is bordered by Homa Bay County to the South, Nandi County to the North East, Kericho County to the East, Vihiga County to the North West and Siaya County to the West. The County covers a total land area of 2009.5 km2 and another 567 km2 covered by water. (Kisumu County Integrated Development Plan, 2013-2017). The specific sampling site, Ziwani Learning Centre is based in Usoma village which is located in Kisumu County, adjacent to Kisumu International Airport and also borders Lake Victoria. This area is endemic for Schistosoma mansoni infections owing to its proximity to the lake. The main economic activities are fishing and sand harvesting. Farming is carried out on a subsistence basis and several households keep livestock such as cattle, goats, sheep, and poultry. There are 2 primary schools and one health center which serve the locals. Some of the homes in the area lack adequate sanitation facilities such as latrines and access to clean water. Open defecation is not uncommon in Usoma village, with some people defecating in open fields, bushes and unfinished buildings. Only a few homes have piped water connections, otherwise most people buy water from water vendors. Still other residents use water from Lake Victoria for domestic functions such as washing clothes and bathing.

Study Design: The research design was descriptive, cross- sectional and utilized a quantitative approach to collect data on knowledge, attitude and practice of soil transmitted

helminthes (STHs), of which knowledge, attitude and practice comprised the independent variables whereas soil transmitted helminthes (STHs)make up the dependent variable.

Sample and Sampling Procedures:

The study population consisted of pupils from Ziwani Learning Centre aged 4- 15 years old.

Inclusion and Exclusion criteria:

Completion of consent forms by the guardian (head teacher) of assenting pupils between the ages of 4-15 years old and any pupil willing to cooperate formed the inclusion criteria. While any pupil who was absent or for whom written consent had not been given, whose age is not between 4-15 years old and not willing to participate formed the exclusion criteria.

Sampling Technique:

Non- probability sampling method, specifically the purposive sampling technique was used due to the small pupil population.

Sample Size:

Due to the small population size and the population size is known to be 114 pupils, The (Israel, 1992) Formula was used to select the appropriate sample size for the study.

$n=N/ (⟦1+N (e⟧^2))$

Where N is the population size.

Where n is the sample size.

e= level of precision=0.05.

Using the formula above we get,

$n=114/(⟦1+114(0.05⟧^2))= 88.72$

Approximately the sample size will be 89 pupils and adding non-response rate of 5% of the 89 we get 4.4 and so the sample size would be 89+4=93.

Data Collection Instruments:

The research instrument comprised of structured questionnaires. The research instrument was researcher- generated and the questions were based on data contained in the literature review pertaining to soil transmitted helminths.

Reliability and Validity of the Instruments:

The research instrument was pre- tested in order to assure its internal validity and suitability of the questions. This exercise was conducted at Usoma Primary School and involved 15 pupils. This step was crucial in informing the suitability of the research instrument as well as any modifications that may be prompted by the outcome so as to enable the study to adequately answer the research questions. The questionnaire comprised of 4 sections that collected data on demographics, knowledge, attitude and practice of soil transmitted helminths respectively.

Data Collection Procedures:

Written consent was sought from the head teacher and the respective pupils were required to assent prior to participation. This involved a session to the guardian a brief description of the study and its purpose after which he signed the appropriate consent forms. The respondents were assured of the confidentiality of their responses by issuing of unique identification numbers during the data collection process. Participant identity was not being disclosed during and after the survey. Data was collected with the help of research assistants whereby structured questionnaires were administered by way of in- person interviews in order to obtain quantitative data. Two research assistants assisted in administering the questionnaires to the pupils.

Data Analysis:

Data was entered using Statistical Packages for Social Sciences (SPPS version 21) and after data entry, it was appended and cleaned for removal of errors or debugging after which the data was analyzed as per the study objectives and tables represented in form of percentages and frequencies produced using SPSS while MS Excel was used to produce neat graphs and charts where necessary as per the study objectives.

Ethical Approval:

A letter of permission to conduct the study was obtained from Uzima University. Relevant consent forms were issued to pupils' guardian to obtain permission to allow the children to participate in the study. Participant identity was protected and

data collected was kept confidential by assigning unique identification numbers to participants. Lockable drawers were used to store the collected data and the soft copy of analyzed data was password- protected and stored in the computer.

3. RESULTS

A total of 90 participants took part in the survey, representing a response rate of 96.77%.

Figure 1: Proportion of gender of the participants. 46% of the participants were Female and 54% of the participants were Male.

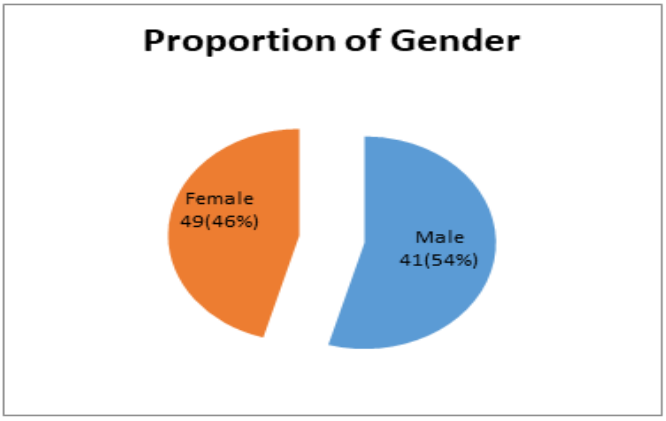
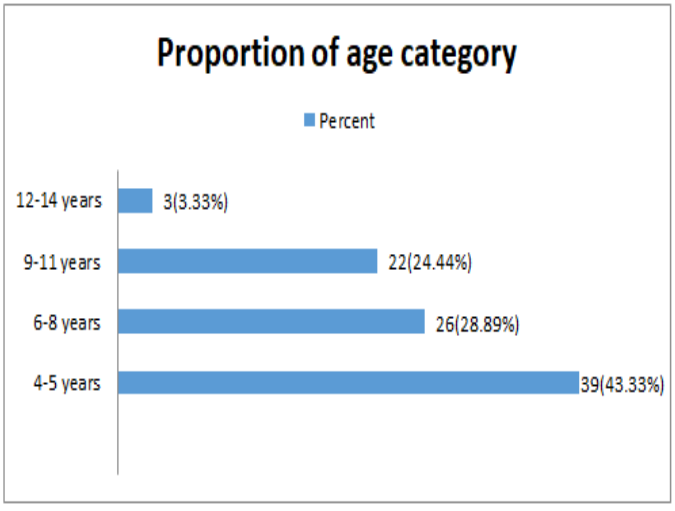


Figure 2 shows the age category among study participants, 3.33% of the pupils were between the Ages of 12 to 14 years, 24.44% of the pupils were between the Ages of 9-11 years, 28.89% of the pupils were between the ages of 6-8 years and 43.33% of the pupils were between the ages of 4-5 years.

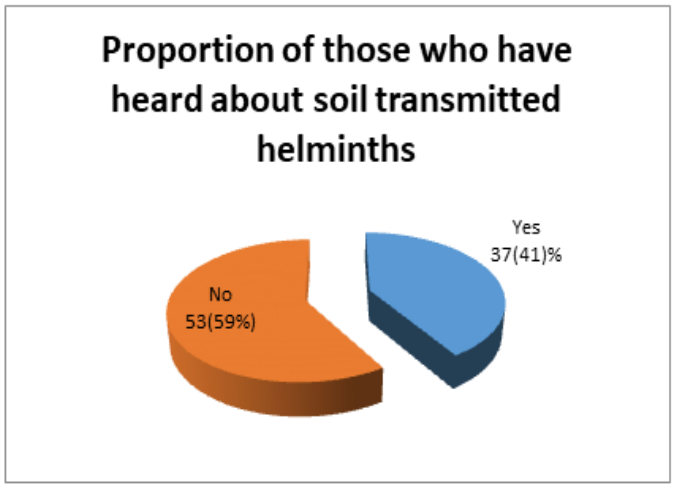
Figure 2: Proportion of Age categories among the study Participants



To assess level of knowledge on STHs among the study participants

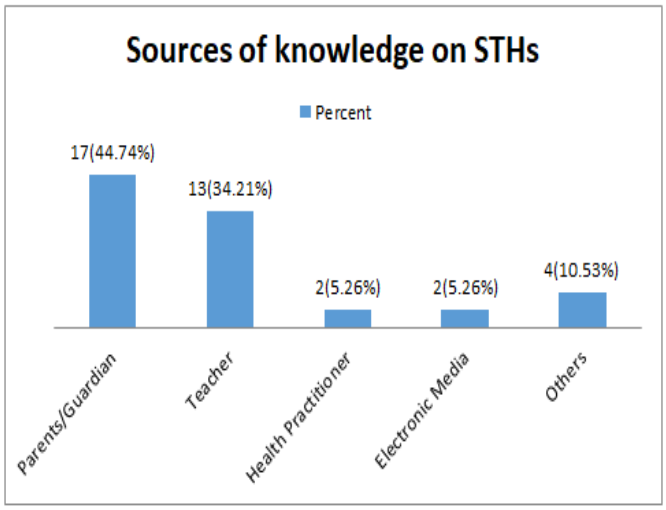
The Figure 3 below shows the proportion of those with knowledge of soil transmitted helminthes.59% of the participants had no knowledge of soil transmitted helminthes and 41% of the participants knew of soil transmitted helminthes.

Figure 3: Knowledge of STHs



The Figure 4 shows 44.74% of the respondents got knowledge of STHs through their Parents/Guardians, 34.21% got knowledge through their Teachers, and 5.26 got knowledge of STHs via Health Practitioner and from Electronic Media and 10.53% got knowledge from other sources apart from the above sources.

Figure 4: Source of Knowledge on STHs

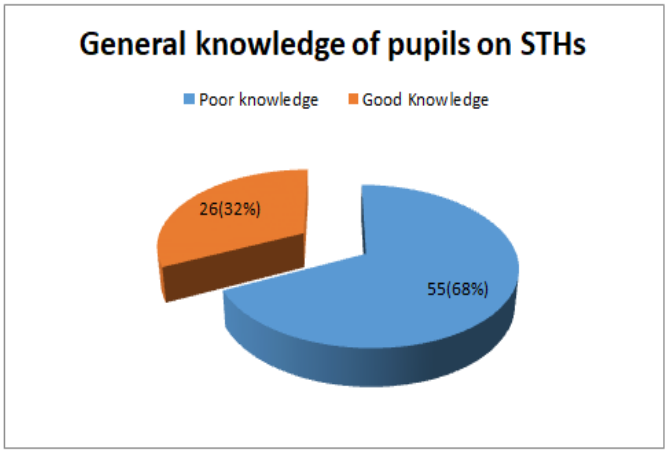


Most of the respondents who reported awareness of STHs reported teachers and parents as their source of information, thus it goes without saying that teachers, parents and other care givers play a

critical role in the fight against STHs. In order to build and strengthen the capacity of caregivers to educate the vulnerable group of children, health education needs to be extended to the community level as some studies such as the one that was done in China revealed low awareness of STHs among parents, (Lu et al., 2015).

The Figure 5 below shows that 26(32%) of the pupils had good knowledge of STHs while 55(68%) of the pupils had poor knowledge of STHs.

Figure 5: General knowledge on STHs



The Table 1 below shows the participants knowledge on soil transmitted helminthes;

On how can a person become infected with STHs, 8.82% of participants claimed you can be infected with STHs when an infected person coughs, 2.94% of the participants claimed you can be infected with STHs through sharing of combs, 58.82% of participants claimed you can be infected with STHs when you eat with dirty hands, 0% of participants claimed you can be infected with STHs when you make noise in class, 2.94% of participants claimed you can be infected with STHs through mosquito bites. On habits that do not lead to infection with STHs; 38.24% of the participants said sharing food with infected persons does not lead to infection, 17.65% of the participants said biting ones finger nails cannot lead to infection, 8.82% of the participants said eating fruits or vegetables before washing cannot led to infection, 5.88% said you cannot contact STHs by walking barefoot, 29.41% of the participants did not know if either of the methods above lead to infection. On which of the signs and symptoms was not associated with STHs, 8.57% said fever is not associated with STHs, 20% of the participants said rashes is not part of the symptoms of STHs, 20% of the participants said swollen eyes is not part of the symptoms of STHs, 5.71% of the participants said swollen stomachs is not part of the symptoms of STHs,8.57% of the participants said painful stomachs is not part of the symptoms of STHs, 11.43% of the participants said cough is not part of the symptoms of STHs, 25.71% of the participants said they don't know if the above mentioned symptoms are of STHs infections. On which of the prevention methods named is not a method of preventing STHs, 0% of the participants said washing hands with soap and water is not a method of prevention, 57.71% of the participants said washing hands with soap listening to loud music is not a method of prevention of STHs,8.57% of the participants said washing hands with soap before eating is not a method of prevention of STHs, 5.71% of the participants said wearing shoes while playing outside is not a method of prevention of STHs,28.57 of the participants did not know if any of the signs above are methods of prevention of STHs

Table 1: Knowledge of Pupils on Soil Transmitted Helminthes

Knowledge on Soil Transmitted Helminthes		
Variables	**Frequency (n)**	**Percentages (%)**
How A person can become infected with STHs		
When infected person Coughs	3	8.82
Sharing combs	1	2.94
Eating with dirty hands	20	58.82
Making noise in class		
Mosquito bite	1	2.94
I don't know	9	26.47
Habits that does not lead to infection with STHs		
Sharing drinks with infected person	13	38.24
Biting one's fingernails	6	17.65
Eating fruits/vegetables before washing	3	8.82
Walking barefooted	2	5.88
I don't know	10	29.41

Signs and Symptoms associated with STHs except one		
Fever	3	8.57
Rashes	7	20.00
Swollen Eyes	7	20.00
Swollen Stomachs	2	5.71
Painful Stomach	3	8.57
Cough	4	11.43
I don't know	9	25.71
STHs prevention except one		
Washing hands with soap and water after visiting the toilet		
Not listening to loud music	20	57.71
Washing hands with soap and water before eating	3	8.57
Wearing shoes when playing Outdoors	2	5.71
I don't know	10	28.57

Even so, pupils who were aware of STHs had poor knowledge on the modes of transmission, prevention strategies and the signs and symptoms of STH infections. Similar findings of poor knowledge among more than half of the study population were reported in Eritrea, Zimbabwe, Malaysia and Nigeria (Ahmed et al., 2017; Fafunwa et al., 2017; Midzi et al., 2011; Nasr et al, 2013; Oyebamiji et al., 2018). This is in contrast to a study done in Bangladesh in which more than 50% of the study population had good knowledge on STHs, attributed to an on- going de-worming program. (Nath et al., 2019). The MDA programs such as the National School Based De-worming Program serve as good entry points for educating school children about STH infections, their causes, prevention methods and hygienic practices that promote good health. The result in the Table 2 below reveals that using One Sample test of Proportion there is enough Statistical evidence to refute the Null Hypothesis and stick with the Alternative hypothesis which states that Less than 50% of the study participants have knowledge of soil transmitted helminthiasis since probability value is 0.0006 at 95%CI (Confidence Interval).

Table 2: One Sample test of Proportion on Knowledge

One sample test of proportion				
Variable	**Mean**	**SD**	**95%CI**	**P-value**
Knowledge	0.32	0.052	0.22-0.42	0.0006

To Determine Pupils' Attitude on Soil Transmitted Helminthiasis

The Table 3 below shows the attitude of pupils on soil transmitted helminthes.

The Majority of the pupils agreed that soil transmitted helminthes are beneficial to human health.

The Majority of the pupils disagreed that it is necessary to seek for soil transmitted helminthes infections.

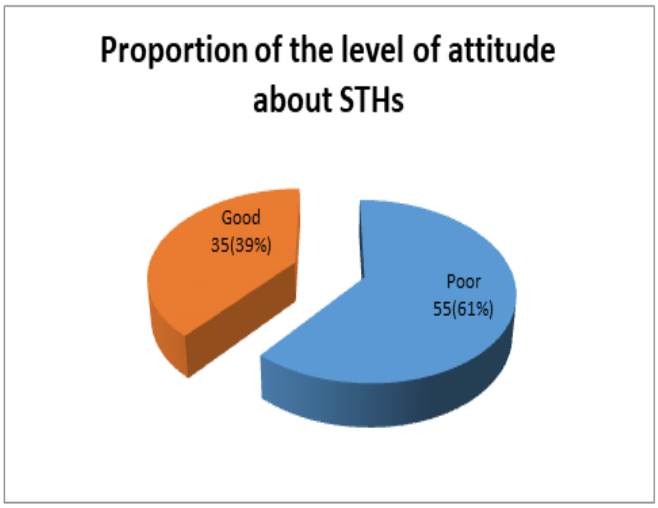
The Majority of the pupils also disagreed that poor personal hygiene does not contribute to infection with soil transmitted helminthes and lastly majority of the pupils also disagreed that children who fail to wash hands after visiting the toilet are more likely to become infected with soil transmitted helminthes than those who do.

Table 3: Attitude on Soil Transmitted Helminthiasis among pupils

Factors	**MEAN±SD**	**Scale Analysis**
Soil transmitted helminthes are beneficial to human health	3.88±1.17	**Agree**
It is necessary to seek for treatment for soil transmitted helminthes infections	1.50±0.66	**Disagree**
Poor personal hygiene does not contribute to infection with soil transmitted helminthes	3.75±1.08	**Disagree**
Children who fail to wash hands after visiting the toilet are more likely to become infected with soil transmitted helminthes than those who do	1.67±0.89	**Disagree**

Figure 6 below reveals that 35(39%) of the pupils had good attitude about STHs while 55(61%) of the pupils had poor attitude about STHs.

Figure 6: Attitude of participants on STHs



Improper attitude of the study population towards STH infections could likely be as a result of poor knowledge. Similar misconceptions about soil transmitted helminths were reported in studies in Kenya's coastal region and in Ghana, (Masaku et al., 2017; Osumanu et al., 2019). In Malaysia, the case was different because more than half of the study population (72.1%) perceived that intestinal worms and protozoa are harmful. The proper attitude towards STHs can be instilled by administering health education to the children. This can be done at school by teachers as well as at home by the care givers. The results in Table 4 below reveal that using One Sample test of proportion, there is enough Statistical evidence to reject the null hypothesis and stick with Alternative hypothesis which claims that Less than 50% of the study participants have the correct attitude about soil transmitted helminthes since the probability value is 0.0175 at 95%CI(confidence Interval).

Table 4: One Sample test of proportion on Attitude

One sample test of proportion				
Variable	**Mean**	**SD**	**95%CI**	**P-value**
Attitude	0.39	0.051	0.29-0.49	0.0175

Sanitation practices among pupils on STHs

The Table 5 below shows the sanitation practices among pupils on STHs. On how often they wash their hands before eating, 58.89% of the pupils said they always wash their hands, 37.78% said they wash their hands sometimes and 3.33% of the pupils said they have never washed their hands before eating. On how often do they wash their hands after defecation; 56.67% said they always wash their hands after defecation, 36.67% said they wash their hands sometimes after defecation, 6.67%% said they never wash their hands after defecation. On what they use to wash their hands, 23.33% of the pupils said they use water only to wash their hands while 76.67% of the pupils said they use water and soap to wash their hands. Poor hygienic practices in this study may be attributed to lack of adequate WASH facilities, such as availability of clean water and soap for washing hands at critical times such as after toilet visits and before eating. It was observed that there was no soap for washing hands and at various times the leaky container had no water either. In similar findings, Manandhar and Chandyo's study reported that only 47% of the study population regularly washed hands with soap and water. Those who did not use soap cited unavailability of soap, (Manandhar & Chandyo, 2018). Similarly, lack of clean running water was found to be a contributing factor to poor hand washing practice in Ghana, (Dajaan et al., 2018). It is likely that most of the hand washing at critical times is done at home, considering the problem of water unavailability at the study site.

It was observed that the classroom floors were earthen and the school compound was covered in murram and hence exposing the children to dirt. Considering the problem of water unavailability, the children are likely to eat with dirty fingers thus increasing the probability of STH infections. On how they keep their nails short, 48.89% of the pupils said they use clipper, 43.33% of the pupils said they use razor blade and 7.78% of the pupils said they bite their nails. On how often they bite their nails, 10% of the pupils said they always bite their nails, 24.44% of the pupils said they bite their nails sometimes, 65.56% of the pupils said they never bite their nails. On the type of toilet they use at home, 78.89% of the pupils said they use latrine at home, 6.67% of the pupils said they use flush toilet at home, 12.22% of the pupils said they use bush or field at home while 2.22% of the pupils said they use bucket at home. On if they wash fruits and vegetables before eating, 71.11% of the

pupils always wash their fruits and vegetables before eating, 24.44% of the pupils sometimes wash their fruits and vegetables before eating and 4.44% of the pupils never wash their fruits and vegetables before eating. It is possible that this good practice of washing fruits and vegetables before consumption is initiated by their guardians at home. These findings are similar to those reported in Ethiopia and different from those of a Kenyan study which reported 60% and 5.5%, respectively on the habit of always washing fruits before consumption, (Abdi et al., 2017; Kisavi, 2014). Only 44% of the pupils reported to safely trimming their nails by using nail clippers. This is probably done by their adult care- givers On if they put on shoes while outside the house, 46.67% said they always put on shoes while going outside the house, 46.67% said they sometimes put on shoes while going outside the house and 6.67% said they never put on shoes while going outside the house. More than 50% of the study populations are exposed to infection by hookworms, (Oyebamiji et al., 2018). Although much lower than the present study, a study done in Ghana revealed that 20.7% of 130 children did not walk barefooted outside while 79.3% always walked barefooted, (Ma et al., 2018). The fact that the Ghanaian study reported much lower percentages could be due to the rural nature of the study site. Higher values of participants always wearing shoes (63%) were reported in Ethiopia, (Abdi et al., 2017).

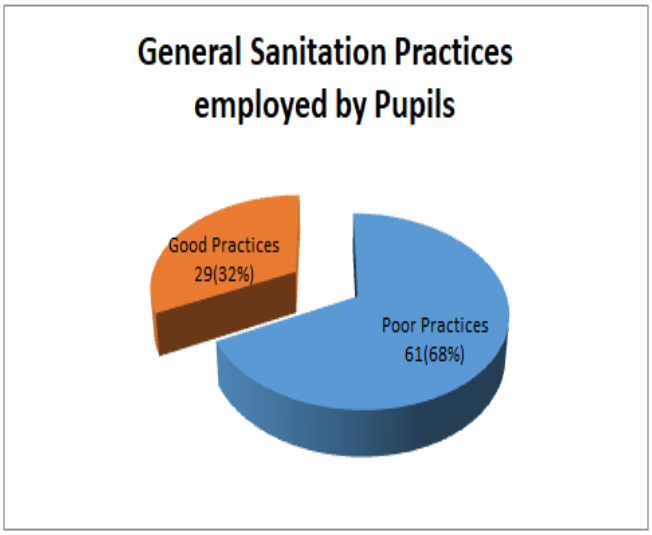
When nail length was examined, 56.67% had trimmed nails while 43.33% had untrimmed nail. Only 44% of the pupils reported to safely trimming their nails by using nail clippers. This is probably done by their adult care- givers. Untrimmed nails have been known to harbor dirt and disease causing germs, (Shumbej & Girum, 2020), hence the 43.3% of the participants with untrimmed nails need to be educated on the risks associated with long nails. On where they go for nature call when in school, 98.89% of the pupils use the school latrine while 1.11% of the pupils go out in the open air. A positive correlation has been found between STH infection and personal hygiene (Darlan & Simorangkir, 2017), implying that the children in this study are at risk of STH infection given that less than 50% of the study population were found to have good sanitation practices.

Table 5: Sanitation practices among pupils on STHs

Practices Among Pupils on STHs					
Variables	**Freq. (n)**	**Percent (%)**	**Variables**	**Freq. (n)**	**Percent (%)**
How often wash their hands before eating			**Type of toilet they use at home**		
Always	53	58.89	Latrine Flush	71	78.89
Sometimes	34	37.78	Toilet	6	6.67
Never	3	3.33	No Facility/bush/field	11	12.22
How often wash their hands after defecation			Bucket	2	2.22
			Wash fruits and vegetables before eating		
Always	51	56.67			
Sometimes	33	36.67	Always	64	71.11
Never	6	6.67	Sometimes	22	24.44
What they use to wash their hands			Never	4	4.44
			Put on shoes while outside the house		
Water only	21	23.33			
Water and soap	69	76.67	Always	42	46.67
How they keep their nails short			Sometimes	42	46.67
Use clipper	44	48.89	Never	6	6.67
Use razor blade	39	43.33	**Examine nail Length**		
Bite the nails	7	7.78	Trimmed	51	56.67
How often they bite their nails			Untrimmed	39	43.33
			When at School where they go for nature calls		
Always	9	10.00			
Sometimes	22	24.44	In school latrine	89	98.89
Never	59	65.56	Open air	1	1.11

Figure 7 reveals that 29(32%) of the pupils had good sanitation practices of STHs while 61(68%) of the pupils had poor sanitation practices of STHs.

Figure 7: General Practices employed by pupils



The results in Table 6 below reveal that using one sample test proportion, Less than 50% of the study participants have hygienic practices that reduce transmission and re-infection by soil transmitted Helminthes hence there is enough statistically evidence to refute the claim which is the null hypothesis Since probability value equals to 0.0004 and 95%CI (Confidence Interval)

Table 6: One sample test of Proportion on Practices

One sample test of proportion				
Variable	**Mean**	**SD**	**95%CI**	**P-value**
Practices	0.32	0.049	0.23-0.42	**0.0004**

4. DISCUSSION

The study revealed that the participants' knowledge on soil transmitted helminths was inadequate. More than half (59%) of the study population lacked prior knowledge on STHs, thus unaware of modes of transmission, prevention methods and signs and symptoms of STH infection. On the attitude towards soil transmitted helminths, the study found out that only 39% of the study population had the proper attitude to soil transmitted helminth infections. This lapse in attitude may be attributable to the corresponding knowledge of the different aspect of STH infections. The sanitation practices of the respondents were not adequate. This was due to the fact the school is resource- limited, lacking in key WASH facilities, such as adequate toilet facilities and hand washing materials, such as clean water and soap. Only 32% of the study population practiced good hygienic habits. Research studies have found a positive correlation between poor sanitation and STH infections, (Tandoh Ma et al., 2018).

5. CONCLUSION

There exists a knowledge gap and poor attitude on STHs among the study participants at Ziwani Learning Centre. A large proportion of the study population lacks awareness of soil transmitted helminths.

6. RECOMMENDATION

We recommend that adequate education be offered to the pupils in order to create awareness and instill knowledge on soil transmitted helminths among the pupils. This can be done as part of the school curriculum and by way of public campaigns at the community level. Health education may also be conveniently administered during the annual MDA that is facilitated by MOH as part of the efforts to combat STHs. The proper attitude towards STHs should be inculcated among the pupils by emphasizing the importance of controlling STH transmission and practicing proper hygiene to prevent re- infection. There is need for improvement of sanitation facilities in order to promote hygienic practices and prevent re-infection by STHs following the Ministry of Health's annual de-worming program. This would involve adequate provision of clean running water and soap for washing hands, improved WASH facilities, such as adequate toilets

8. REFERENCES

1. Abdi, M., Nibret, E., & Munshea, A. (2017). Prevalence of intestinal helminthic infections and malnutrition among schoolchildren of the Zegie Peninsula, northwestern Ethiopia. Journal of Infection and Public Health, 10(1),

84–92. https://doi.org/10.1016/j.jiph.2016.02.009
2. African, E., & Journal, M. (2016). Burden of Soil Transmitted Helminthiases in Primary. 2016(10), 32–39.
3. Ahmed, K. S., Siraj, N. M., Fitsumberhan, H., Isaac, S., Yohannes, S., Eman, D., … Araya, M. (2017). Knowledge, Attitude and Practice (KAP) Assessment of Intestinal Parasitic Infection among School Children in Asmara, Eritrea. Health, 09(01), 57–68. https://doi.org/10.4236/health.2017.91005
4. ALBashtawy, M. (2017). Assessment of hand-washing habits among school students aged 6–18 years in Jordan. British Journal of School Nursing, 12(1), 30–36. https://doi.org/10.12968/bjsn.2017.12.1.30
5. Amenu, D. (2014). Assessment of Soil-Transmitted Helminths Infections, Malnutrition and Anemia among Primary School Children. World Journal of Life Sciences Research, 1(1), 1–6.
6. Anuar, T. S., Salleh, F. M., & Moktar, N. (2014). Soil-transmitted helminth infections and associated risk factors in three Orang Asli tribes in Peninsular Malaysia. Scientific Reports, 4, 4101. https://doi.org/10.1038/srep04101
7. Assafa, D., Kibru, E., Nagesh, S., Gebreselassie, S., Deribe, F., & Ali, J. (2004). Medical Parasitology.For health science students.Produced in Colaboration with the Ethiopian Public Health Training Initiative,The Carter Center,The Ethiopian Ministry of Health and the Ethiopian Ministry of Education.Jimma University.
8. CE, U., & NC, O. (2016). Prevalence of Intestinal Helminthiasis among Children with Chronic Neurologic Disorders in University of Nigeria Teaching Hospital (UNTH) Ituku-Ozalla. Journal of Neurological Disorders, 04(01), 1–6. https://doi.org/10.4172/2329-6895.1000258
9. Dajaan, D. S., Addo, H. O., Ojo, L., Amegah, K. E., Loveland, F., Bechala, B. D., & Benjamin, B. B. (2018). Hand washing knowledge and practices among public primary schools in the Kintampo Municipality of Ghana. International Journal of Community Medicine and Public Health, 5(6), 2205. https://doi.org/10.18203/2394-6040.ijcmph20182146
10. Darlan, D. M., & Simorangkir, H. A. (2017). Correlation Behaviour , Personal Hygiene , Home environment Sanitation With Prevalence Of Soil Transmitted Helminthes infection Among Primary School Children In Medan. International Journal of ChemTech Research, 10(6), 170–174.
11. Fafunwa, T. S., Mogaji, H. O., Oluwole, A. S., Adeniran, A. A., Fagbenro, M. T., Sam-Wobo, S. O,Ekpo, U. F. (2017). Water Resource, Hygienic Practice, and Soil Transmitted Helminthiasis in Some Rural Communities of Osun State, Nigeria. Journal of Water Resource and Protection, 09(02), 99–110. https://doi.org/10.4236/jwarp.2017.92008
12. Goel, S., Tank, R., Singh, A., Khichi, S., Goyal, P., & Arya, R. (2016). Prevalence and risk factors of soil transmitted helminths from rural field practice area of a tertiary care center from northern India. International Journal of Research in Medical Sciences, 4(6), 1983–1987. https://doi.org/10.18203/2320-6012.ijrms20161746
13. Gordon, C., Kurscheid, J., Jones, M., Gray, D., & McManus, D. (2017). Soil-Transmitted Helminths in Tropical Australia and Asia. Tropical Medicine and Infectious Disease, 2(4), 56. https://doi.org/10.3390/tropicalmed2040056
14. Greenland, K., Dixon, R., Khan, S. A., Gunawardena, K., Kihara, J. H., Smith, J. L., … Kumar, S. (2015). The Epidemiology of Soil-Transmitted Helminths in Bihar State, India. PLoS Neglected Tropical Diseases, 9(5), 1–14. https://doi.org/10.1371/journal.pntd.0003790
15. Jain, S. K., Dwivedi, A., Shrivastava, A., Vijayananth, P., Vidyavardhini, R., & Venkatesh, S. (2016). Prevalence of soil-transmitted helminthic infection in India in

current scenario: A systematic review. Journal of Communicable Diseases, 48(2), 24–35.
16. Kisumu-County-Integrated-Development-Plan_CIDP_2013-2017. (2017). Republic of Kenya: Kirinyaga County first county integrated towards a globally competitive and prosperous nation. (September 2013). Retrieved from https://roggkenya.org/wp-content/uploads/docs/CIDPs/Kisumu-County-Integrated-Development-Plan_CIDP_2013-2017.pdf
17. Kisavi, P. M. (2014). Prevalence and factors associated with soil transmitted helminth infection among primary school children in Kikumuni sub-location, Machakos County , Kenya Phoebe Mutila Kisavi A thesis submitted in partial fulfillment for the degree of Master of Science.
18. Kuantan, M., Bölgesi, P., Okul, M., Uygulamaları, T., Yusof, A. M., & Isa, M. L. (2017). AFZAN MAT YUSOF and MUHAMMAD LOKMAN MD ISA Intestinal Helminths and Protozoa Infection Among Parents of School Children in Malaysia. Retrieved from http://dergipark.gov.tr/download/article-file/401875
19. Lu, L., Liu, C., Zhang, L., Medina, A., Smith, S., & Rozelle, S. (2015). Gut Instincts: Knowledge, Attitudes, and Practices regarding Soil-Transmitted Helminths in Rural China. PLoS Neglected Tropical Diseases, 9(3), 1–15. https://doi.org/10.1371/journal.pntd.0003643
20. Ma, T., Fc, M., & Ak, A. (2018). iMedPub Journals Disparities of Sanitary Conditions / Habits and Helminthiasis Prevalence between School-Age-Children Living in Fishing and Farming Communities in Ghana : A Cross Sectional Study. 1–16. https://doi.org/10.21767/2472-1093.10004
21. Malavade, S. S. (2015). Assessment of Soil Transmitted Helminth Infection (STHI) in School Children, Risk Factors, Interactions and Environmental Control in El Salvador. ProQuest Dissertations and Theses, (January), 159. Retrieved from https://acces.bibl.ulaval.ca/login?url=http://search.proquest.com/docview/1719259661?accountid=12008%5Cnhttp://sfx.bibl.ulaval.ca:9003/sfx_local??url_ver=Z39.882004&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&genre=dissertations+%26+theses&sid=ProQ:Pro
22. Manandhar, P., & Chandyo, R. K. (2018). Hand washing knowledge and practice among school going children in Duwakot, Bhaktapur: A cross sectional study. Journal of Kathmandu Medical College, 6(3), 110–115. https://doi.org/10.3126/jkmc.v6i3.19827
23. Masaku, J., Mwende, F., Odhiambo, G., Musuva, R., Matey, E., Kihara, J. H., … Njomo, D. W. (2017). Knowledge, practices and perceptions of geo-helminthes infection among parents of pre-school age children of Coastal region, Kenya. PLoS Neglected Tropical Diseases, 11(3), 1–18. https://doi.org/10.1371/journal.pntd.0005514
24. Midzi, N., Mtapuri-Zinyowera, S., Mapingure, M. P., Paul, N. H., Sangweme, D., Hlerema, G., … Mduluza, T. (2011). Knowledge attitudes and practices of grade three primary schoolchildren in relation to schistosomiasis, soil transmitted helminthiasis and malaria in Zimbabwe. BMC Infectious Diseases, 11. https://doi.org/10.1186/1471-2334-11-169
25. Ministry of Education Science and Technology. (2014). Kenya National School-based deworming programme. (April 2013). Retrieved from https://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=0ahUKEwiOyryN97nWAhVIESwKHckgD5cQFgg2MAM&url=https%3A%2F%2Fciff.org%2Fdocuments%2F16%2FKenya_National_SchoolBased_Deworming_Programme_Year2_evaluation.pdf&usg=AFQjCNGDY42
26. Mwandawiro, C., Okoyo, C., Kihara, J., Simiyu, E., Kepha, S., Campbell, S. J., … Njenga, S. M. (2019). Results of a national school-based deworming programme on soil-transmitted helminths infections and schistosomiasis in Kenya: 2012-2017.

Parasites and Vectors, 12(1), 1–18. https://doi.org/10.1186/s13071-019-3322-1
27. Nasr, N. A., Al-Mekhlafi, H. M., Ahmed, A., Roslan, M. A., & Bulgiba, A. (2013a). Towards an Effective Control Programme of Soil-Transmitted Helminth Infections among Orang Asli in Rural Malaysia. Part 1: Knowledge, Attitude, and Practices. Parasites and Vectors, 6(28), 1–12. https://doi.org/10.1186/1756-3305-6-27
28. Nasr, N. A., Al-Mekhlafi, H. M., Ahmed, A., Roslan, M. A., & Bulgiba, A. (2013b). Towards an effective control programme of soil-transmitted helminth infections among Orang Asli in rural Malaysia. Part 2: Knowledge, attitude, and practices. Parasites and Vectors, 6(1), 1–12. https://doi.org/10.1186/1756-3305-6-27
29. Nath, T. C., Padmawati, R. S., Alam, M. S., Das, S., & Murhandarwati, E. H. (2019). Elimination of soil-transmitted helminthiasis infection in Bangladesh: Knowledge, attitudes, and practices regarding mass drug administration. Journal of Global Health Reports, 2, 1–10. https://doi.org/10.29392/joghr.2.e2018001
30. Okoyo, C., Nikolay, B., Kihara, J., Simiyu, E., Garn, J. V, Freeman, M. C., … Mwandawiro, C. S. (2016). Monitoring the impact of a national school based deworming programme on soil- transmitted helminths in Kenya : the first three years, 2012 – 2014. Parasites & Vectors, 1–13. https://doi.org/10.1186/s13071-016-1679-y
31. Organization, W. H. (2017). Integrating neglected tropical diseases into global health and development: fourth WHO report on neglected tropical diseases. In World Health Organization. Retrieved from http://apps.who.int/iris/bitstream/10665/255011/1/9789241565448-eng.pdf?ua=1
32. Osumanu, I. K., Kosoe, E. A., & Ategeeng, F. (2019). Determinants of Open Defecation in the Wa Municipality of Ghana: Empirical Findings Highlighting Sociocultural and Economic Dynamics among Households. Journal of Environmental and Public Health, 2019, 1–10. https://doi.org/10.1155/2019/3075840
33. Oyebamiji, D. A., Ebisike, A. N., Egede, J. O., & Hassan, A. A. (2018). Knowledge, attitude and practice with respect to soil contamination by Soil-Transmitted Helminths in Ibadan, Southwestern Nigeria. Parasite Epidemiology and Control, 3(4), e00075. https://doi.org/10.1016/j.parepi.2018.e00075
34. Peiling Yap. (2015). Epidemiology and burden of soil-transmitted helminth infections among school-aged Bulang children in Yunnan province , People ' s Republic of China.
35. Pullan, R. L., Smith, J. L., Jasrasaria, R., & Brooker, S. J. (2014). Global numbers of infection and disease burden of soil transmitted helminth infections in 2010. Parasites and Vectors, 7(1), 1–19. https://doi.org/10.1186/1756-3305-7-37
36. Puthiyakunnon, S., Boddu, S., Li, Y., Zhou, X., Wang, C., Li, J., & Chen, X. (2014). Strongyloidiasis—An Insight into Its Global Prevalence and Management. PLoS Neglected Tropical Diseases, 8(8). https://doi.org/10.1371/journal.pntd.0003018
37. Sakari, S. S. W., Mbugua, A. K., & Mkoji, G. M. (2017). Prevalence of Soil-Transmitted Helminthiases and Schistosomiasis in Preschool Age Children in Mwea Division, Kirinyaga South District, Kirinyaga County, and Their Potential Effect on Physical Growth. Journal of Tropical Medicine, 2017, 1–12. https://doi.org/10.1155/2017/1013802
38. Shumbej, T., & Girum, T. (2020). Helminth infections in light of an ongoing intervention in endemic areas of Guragae zone , Southern Ethiopia : an implication for neglected tropical diseases elimination in Ethiopia by 2020. (2019), 1–8.
39. Sofiana, Liena;Ipa, Mara; Sumarni, S. (2011). Fingernail biting increase the risk of soil transmitted helminth (STH) infection in elementary school children. Health Science Journal of Indonesia, 2(Vol 2, No 2 Des (2011)), 81–86.

40. Steinbaum, L., Mboya, J., Mahoney, R., Njenga, S. M., Null, C., & Pickering, A. J. (2019). Effect of a sanitation intervention on soil-transmitted helminth prevalence and concentration in household soil: A cluster-randomized controlled trial and risk factor analysis. PLoS Neglected Tropical Diseases, 13(2), 1–17. https://doi.org/10.1371/journal.pntd.0007180
41. Tabi, E. S. B., Eyong, E. M., Akum, E. A., Löve, J., & Cumber, S. N. (2018). Soil-transmitted helminth infection in the tiko health district, south west region of cameroon: A post-intervention survey on prevalence and intensity of infection among primary school children. Pan African Medical Journal, 30, 1–9. https://doi.org/10.11604/pamj.2018.30.74.15676
42. Tefera, E., Belay, T., Mekonnen, S. K., Zeynudin, A., & Belachew, T. (2017). Prevalence and intensity of soil transmitted helminths among school children of Mendera Elementary School, Jimma, and Southwest Ethiopia. The Pan African Medical Journal, 27, 88. https://doi.org/10.11604/pamj.2017.27.88.8817
43. Tomczyk, S., Deribe, K., Brooker, S. J., Clark, H., Rafique, K., Knopp, S. … Davey, G. (2014). Association between Footwear Use and Neglected Tropical Diseases: A Systematic Review and Meta-Analysis. PLoS Neglected Tropical Diseases, 8(11). https://doi.org/10.1371/journal.pntd.0003285
44. Werkman, M., Wright, J. E., Truscott, J. E., Easton, A. V., Oliveira, R. G., Toor, J., … Anderson, R. M. (2018). Testing for soil-transmitted helminth transmission elimination: Analysing the impact of the sensitivity of different diagnostic tools. PLoS Neglected Tropical Diseases, 12(1), 1–20. https://doi.org/10.1371/journal.pntd.0006114
45. WHO. (2007). Global Plan to Combat Neglected Tropical Diseases 2008-2015. Who/Cds/Ntd/2007.3.
46. WHO. (2012). WHO_TRS_972_eng.pdf.part. Technical Report Series, (972).
47. Wood, S. (2008). A Guide to Developing Knowledge, Attitude and Practice Surveys. World Health Organisation, 1–68. Retrieved from papers2://publication/uuid/F52C6E32-6B86-4DCC-A96C-4ED36F8491A8
48. World Health Organization Regional Office for Africa. (2013). Improved school-based deworming coverage through intersectoral coordination: The Kenya experience. 24. Retrieved from https://www.afro.who.int/sites/default/files/2017-06/kenya-case-study_improved-deworming-coverage_intersectoral-coordination.pdf
49. World Health Orgnization (WHO) Technical Report Series; 830. (2012). To Overcome the Global Impact of Neglected Tropical Diseases. Who, 42.