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SOIL TRANSMITTED HELMINTHES INFECTION AMONG SCHOOL CHILDREN IN SHIKAN LOCALITY NORTH KORDOFAN STATE 2017

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ABSTRACT

This cross sectional community based study was conducted to determine the prevalence of (soil-transmitted helminths) infections among primary school pupils in North kordafan State, Sudan; a Sample of 383 pupils' in duration from April 2016 to November 2017 was selected. was examined parasitic infections by using a direct smear examination (Kato–Katz techniques). Also a questionnaire was filled by the participants. Our results showed an overall prevalence rate was 38.1% soil-transmitted helminthes infections amongst the pupils. The various soil transmitted helminthes isolated were *Ascaris lumbricoides* (45%), *Hookworm* (29.5%), *Trichuris trichuria* (19.8%) and infected pupils by more than one species of Soil Transmitted Helminthes (STH) was (4.1%). The incidence of infection was similar in age group 6- 14 was (38% -39%) however it was lower in age group 15 – 17 was (28%) probably due to improved hygiene. The study showed a significant relation between Many factors affect STH infections like hygiene, source of water in school (P=0.000) buy food and Breakfast (P=0.05), wash your hands before eating(P= 0.011) and after use bathroom(P=0.05) and Fingernails trimmed(P=0.003) These habits were the most determinant risk factors for overall prevalence of intestinal helminthes. The high prevalence (above 20%) and diversity of soil transmitted helminthes among children in North Kordfan requires that health authorities carry out urgent interventions like public treatment as recommended by the WHO.

KEYWORDS: Soil transmitted helminthes, school age children, *Ascaris lumbricoides*, and epidemiology.

INTRODUCTION

The soil-transmitted helminthes are a group of parasitic worm including *Ascar is lumbricoides* and *Trichuris trichiura* which are primarily spread through faecal transmission(*Bethony et al., 2006*). Particularly world wide the most are the roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*), and *hookworms* (*Necator americanus or Ancylostoma duodenale*). They are considered together because they are common for a single individual, especially a child living in a less developed country, to be chronically infected with all three worms. Such children have malnutrition, growth stunting, intellectual retardation, and cognitive and educational deficits. Andrade and Alava (2001).

Soil transmitted helminthes infections is a global problem; more than 2 billions people are infected with at least one species. The most common conditions affecting the poorest especially 533 million people living in sub-Saharan Africa (SSA), Approximately 85% of the NTD disease burden results from helminth infections was *Hookworm* infection occurs in almost half of SSA's poorest people, including 40–50 million school-aged children and 7 million pregnant women in whom it is a leading cause of anemia.(WHO, 2004).

It is estimated that 173 million and 162 million people are infected in SSA with *Ascaris and Trichuris*, respectively, with 36 million school-aged children infected with ascariasis and 44 million with *trichuriasis* (*Bethony et al., 2006*) (Andrade C, Alava T, 2001). For both infections the largest number of cases occurs in Nigeria. The estimated 181 million school-aged children in SSA, almost one-half (89 million) are infected with hookworm, ascariasis, trichuriasis, or some combination of these STH infections *Bethony et al., 2006*, WHO, 2010) In Sudan was few published data available, in El dhayga in Central Sudan 2008 a study found prevalence rates of parasite infections was (90.4%) of which *Ascaris lumbricoides* accounted for 32.5% (*Abdel-aziz et al. 2010***),** prevalence of STH was also reported as high at 7.8% in Southern Kordfan (*Abou-Zeid et al.2012*)A survey was conducted at a large number of sites throughout Sudan in 1994 examined 2489 fecal samples found 53% of samples positive for STH (*Bethony et al.,2006*). The conclusion of the Federal Ministry of Health FMoH is that the cumulative prevalence of infection with at least one STH ranged from 10-35% with the majority of infection in Southern Sudan*(Hugh. et al. 2009*).

Many factors affect transmission of STH like poor sanitation and/or personal hygiene, poor household and/or environmental hygiene, these are directly linked to the level of poverty and formal education. Especially in poor populations in sub-Saharan Africa, as a result of

inadequate sanitation, lack of clean drinking water and health care assistance, poverty and malnutrition STH infections were high in children resulting in malnutrition, anemia, and they have a negative impact on development and educational performance.

Use of night soil (human excrement) as fertilizer for crops or gardens is also a risk factor. Moreover, geophagia (deliberate consumption of earth, soil, or clay) most often seen in tribal and rural societies among children and pregnant women is common.

Infection can result in significant consequences for health and development, affecting growth, promoting anaemia and causing some overt clinical disease, much of which is rapidly reversed by treatment (*Warren et al., 1993*; *Hotez et al., 2005*). In addition to these impacts on health and physical development, infected schoolchildren perform poorly in tests of cognitive function; when treated, immediate educational and cognitive benefits are apparent only for children with heavy worm burdens or with concurrent nutritional deficits (*Bethony et al., 2006*). Studies suggest that children are more ready to learn after treatment for worm infections and may be able to catch up if this learning potential is exploited effectively in the classroom. In Kenya treatment reduced absenteeism by one quarter, with the largest gains for the youngest children who suffered the most ill health *Miguel and Kremer(2004).*

Recognizing the centrality of school age children to the response to helminth infection, in 2001, the 54th World Health Assembly of the WHO passed a resolution to provide regular deworming treatment to 75 percent of school-age children at risk (an estimated target population of 398 million) by 2010. The WHO recommends delivery of … MDA with either albendazole or mebendazole once a year to pre-school and school-aged children, as well as to pregnant women and high risk groups of adults, where cumulative prevalence of STH is >20% and <50%, and twice a year where prevalence is >50% (WHO, 2010).

Recommended drugs for use in public health programmes to control STH infection are the benzimidazole anti helmintics (BZAs), albendazole or mebendazole; older drugs including pyrantel pamoate and levamisole are also occasionally used in some developing countries (WHO, 2002); *Utzinger and Keiser, (2004)*. In areas where STH infections, BZAs the major drug used for the treatment of STH (*Fenwick et al., 2003).*

Objectives

To study Prevalence transmation patterns and effect on school performance soil transmitted helminthes infection among school children -aged 6-17 year in Shikan locality North Kordofan 2015- 2017.

Specific objectives

1. To measure the prevalence of soil transmitted helminthes infection among school age children.
2. To study the risk factors of infection among school- age children in shikan locality.
3. To determine the knowledge, attitude, behaviors of school- age children toward hygiene
4. To study the effect of soil transmitted helminthes infection on children school performance

MATERIALS AND METHODS (METHODOLOGY)

Study design

This was a cross-sectional community base descriptive study conducted among primary school children in Shikan, North Kordfan State, sudan.

Study area/setting

This study was conducted in North Kordofan state It was geographically located in western part of Sudan with an area of 185,302 km² and an estimated population density of (3,340,000) (2011census) The number of primary student (426.890)(2014), the state divided into (8) localities in which there are (1,438) primary school, in Shikan locality (107.609) student in (290) schools. Elobied is the capital of the state. is generally arid and desert and inhabited by nomads and pastoralists.

Study population/ subjects

Population comprised a children of primary school aged 6 -17 years, the samples were selected by random sampling of school children, in schools in North Kordofan State

Sample size

$$\frac{pqz^2}{d^2}$$

n= is the number of children school required in the study

p= the proportion of school children expected to be infected by intestinal helminthes(.05)

q=(1-p)

z=confidence level at 95%(standard value(1.96)

d=margin of error at 5%(standard value(0.5)

n_0 = 384

$$n = \frac{n_0}{1+\frac{n_0-1}{N}}$$

$$n = \frac{384}{1+\frac{384-1}{107,609}} = 383$$

Sample size included 383 stool samples were collected. A random cluster sample of schoolchildren Since the prevalence rate (p) was unknown in the study areas maximum prevalence (P = 50%) was assumed, with a marginal error of 5% and 95% confidence interval. For non-response rates, 5% of the sample size was included The Sampling technique, random from the administrative units were selected randomly, 15 schools within the administrative units were randomly chosen. Children from the school were random selected from registration lists.

Data Collection

Data was collected via a questionnaire .and Stool sample was collected following the Kato–Katz techniques.

Data analysis

The intensity of each STH infection was expressed as the mean of eggs per gram counts. Percentages were calculated and compared between the groups using $\chi 2$ test, and ANOVA, Multivariate, test using SPSS version 24 taking p value equal 0.05 was considered significant.

RESULTS

This study was conducted among 383 school age children in selected 15 schools, was goal of this study was identify the prevalence transmtion patterns of soil transmitted helminthes infection among primary school children in Shikan North Kordfan State.

Among the respondents male participants were more in number than female, 208 boys (54.3%) and 175 girls (45.7%).

Table 1: Prevalence distribution of soil-transmitted helminthes among the primary schools children in shikan locality (N=383).

Variable	Prevalence %	male n (%)	female n (%)
Ascaris lumbricoides	45.9	25.4	20.5
Trichuris trichuria	13.1	13.1	6.8
Ancylostoma duodenale	17.2	10.1	7.1
Necator americanus	12.3	6.8	5.5
More than one	4.1	3.4	0.7

The prevalence rate was 38.1% soil-transmitted helminthes infections amongst the sampled schools children in this study participants, Were (45.9%), (32.1%), (19.8%) Ascaris lumbricoides, Hookworm Trichuris trichuria respectively. Also, 4.1% of the pupils were infected by more than one species of soil-transmitted helminthes show table 1.

Table 2: Prevalence of soil transmitted helminthes infection according to age and Gander distribution among the primary schools children in shikan locality (N=383).

Variable	Number Examined	Normal n (%)	Infected n (%)	P-value
Age				
6 – 8	31	19 (61.3)	12 (38.7)	0.001
9 -11	81	50 (61.7)	31 (38.3)	
12- 14	233	141 (60.5)	92 (39.5)	
15- 17	38	27 (71.1)	11 (28.9)	
Gander				
Male	208	125 (60.1)	83 (39.9)	0.001
Female	175	112 (64)	63 (36)	

Were in the age group range was 6 – 17 years were 12 -14 (60.8%), 9 - 11 (21.2%), 15 -17 (9.9%), (6-8) (8.1%), The incidence of infection was similar in age group 6- 14, (38% -39%) however it was lower in age group 15 – 17 (28%) probably due to improved hygiene, There was a higher and weight prevalence of age significantly (P > 0.05) significantly (P = 0.001). show table 2.

The Height range was, 141 -160 cm (50.6%), 121 -140 (32.1%), 100 -120 cm (9.3%)) under 100cm (7.3%), above 160 cm (.6%), The weight range was 31 -40 km (69.9%), 20 -30 km (17.2%) under 20 km (11.7%), 41 -50 km (3.9%) above 50 km (0.3%).

The mean egg count (EPG) recorded for the age group (12 – 14 years), 2841.12 was the highest in all the groups followed by the value recorded for the 6 – 14 years age group,

1893.1. There was a drop in the mean EPG value from age group 6– 8 years, 860.66 down to the 15 – 17 years age group, 392.64. For males, there were no significant differences in egg counts among all the age The egg load for females in the 1 -10 years group was not significantly (P > 0.05) different from that of the 15 – 17 years group.

Among the participants. (29.5%) and (70.5%) reported of play with dirty and wet places and no played respectively, behaviors eating mud were eating (17.2%) and (82.8%) no eating mud, (68.4%) reported wash your hands with soap and water before eating and (31.6%) unwashed were (61.4%) reported wash your hands after using the bathroom and (36.6%) unwashed.

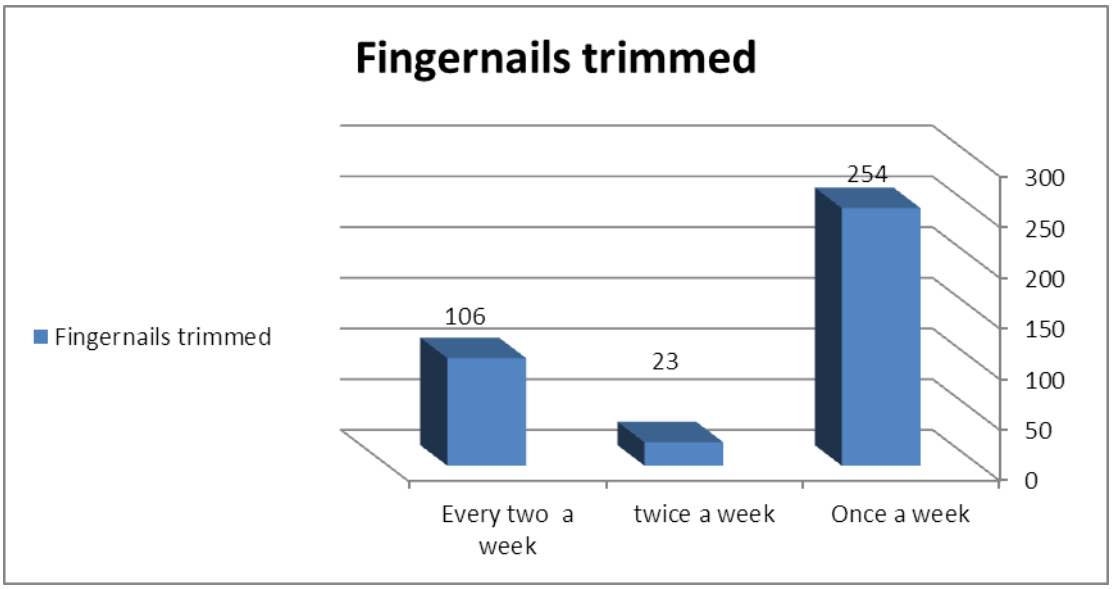

Figure I: Fingernails trimmed distribution of soil-transmitted helminthes among the primary schools children in Shikan locality (N=383).

On this study was reported times shorten your Fingernails trimmed (66%), were Once a week, every two weeks (27.7%) and (6.3%) trimmed tow in a week show Figure I).

On this study was revealed that source of drinking water in schools were reported (83.6%) Aziar, (13.8%) Ground Basin, (3.2%)Tap water and (.3%) Coolers, buy breakfast was (36.3%), Hawkers (27.5%) Buffet of school (27.4%), at home, and Shop (8.6%).

All the school were found latrine (100%), uses sanitary latrine human waste disposal were Pit latrine (6.8%) Normal toilet (34.5%) septic tank (58.7%).

Among the respondents of pupils was revealed that reported of knowing of parasitic STH The knowldge of parasitic soil transmitted helminthes, were *Ascaris lumbricoides*(24.5%), *Trichuris trichiura* (34.%), *hookworm spp were Ancylostoma duodenale* (24.1%) *and Necator americanus* (17.5%), and knowldge of Diseases transmitted soil helminthes was diarrhoea (43.6%), anemia (25.6%) Malnutrition (24%), (6.8%) All that is true. (46.7%), (27.9%), (25.4%) of respondent that were reported of Transfer of infection whith Penetration of the skin, Larvae of worms and Eggs swallowed respectively.

Among the participants was revealed that infections with helminthes STH previous were (28.2%) and (71.8%) un infections, The present study showed that were (75.9) went to the health center and Public Medical Services and sought to treatment, (24.1%) un wanted, 63.8% stool examination.

It was revealed that 14.6%, 7.3%, 6.3%, the number times have helminthic infections that disease infections, once, twice, more than twice respectively and (71.8%) had no infection at all.

It was revealed that (39.2%), (31.3%), 12.5%), (9.1%) (7.8%) of respondent reported of knowing of symptoms, diarrhea, abdominal pain, Fever, Headache and Vomiting respectively.

Among the participants It was revealed that were times absent from school due to illness were Day (14%), a week(11.4%), two weeks(6.5%), a month(2.3%), and (61.8%). unabsent had no infection at all.

Helminthes infection and effects of school performance Among 146 infected It was revealed that 86.9% reported of deterioration level academic due to illness and 13.1% un deterioration.

Among the participants 60.3% reported taking preventive treatment Abandazole and mebendzole, 39.9% no taking.

Moreover, the were the age group of a child's mother was 31 – 40 (42.6%) followed by 41 – 50 (37.6), 20 – 30 (19.3%) and More than 50(O.5%).

Moreover, the education level of a child's mother were, Basic school 46.5%, followed by scandry school 22.5%, University and postgraduate 14.3%, Illiterate 13% and Khalwa 3.7%,

the education level of a child's Father were Basic school 31%, 2ry school 30.9%, University and postgraduate 21%, Illiterate 10.9% and khlawa 6.2% 46.7% reported of existence of animals in house and 53.3% no existence, Source of drinking water in home reported were Pipe (55%), Ground tank (31.8%), ground water (9.2%) and Pump (4.%).

Were History of diarrhea in family was 32.8% reported infections, 67.2% no infected, Results prevalence of Tribe school age participants were Falata (60.7%) Bideriya (52.1%) Kababish(46.7%), Arab nomads (44.4%), Dar-Hamid (35.7%) Guamaa (34.6%), Hamr(34.3%), Galia (23.%), Alhoawir(22%) and Others (16%).

Table 3: Source of water and hygiene distribution of soil-transmitted helminthes among the primary schools children in Shikan locality (N=383).

Variable	Number examined	Normal n(%)	Infected n (%)	P-value
Source of drinking water in school				
Pipe water	9	5 (55.6%)	4 (44.4%)	0.000
Coolers	1	1 (100%)	0 (0%)	
Aziar	320	195 (60.9%)	125 (39.1%)	
Basin Ground	53	36 (67.9%)	17 (32.1%)	
Buy Breakfast				
school Buffet	105	80 (76.2%)	25 (23.8%)	.05
at home	106	74 (69.8%)	32 (30.2%)	
Hawkers	139	61 (43.8)	78(56.2%)	
Shop	33	22 (66.7%)	11 (33.3%)	
wash your hands before eating				
Yes	262	2 (0.8%)	260(99.2%)	. 011
NO	168	142(84.5%)	25 (15.5%)	
Wash hands after bathroom				
Yes	253	26(6.8%)	219(93.2%)	.05
NO	148	120 (71.1%)	28 (18.9%)	
Fingernails trimmed				
Once a week	254	205 (80.7%)	49 (19.3%)	.003
Twice a week twice	23	23 (100%)	0 (0%)	
Every tow a week	106	9 (8.5%)	97 (91.5%)	

Multivariate analysis was calculated for variables that showed significant association in bivariate analysis. between worms infection and school setting There fore, Source of drinking water in school (p=0.000), buy Breakfast (p=0.05), There were significant associations observed between worms infection hand washing after defecation (p=0.05), regular hand wash before meals (p=0.011), Fingernails trimmed (p=0.003) Table 3.

Table 4: Mother´s age and level of education distribution of soil-transmitted helminthes among the primary schools children in Shikan locality (N=383).

Variable	Number Examined	Normal n(%)	Infected n (%)	P-value
Mother´s age				
20 -30	74	15 (20.3%	59 (79.7%)	0.04
31 – 40	163	78 (47.9%)	85 (52.1%)	
41-50	144	133 (99.3%)	1 (0.7%)	
More than 50	2	1 (50%)	1 (50%)	
Mother´s level of education				
illiterate	50	17 (34%)	33 (66%)	0.05
Khalawa	14	5 (35.8%)	9 (64.2%)	
Basic school	178	116 (65.1%)	62 (34.9%)	
Scan dry school	86	50 (58.1%)	36 (41.2%)	
university & postgraduate	55	49 (89%)	6 (11%)	

There were significant associations observed between worms infection and age Mother´s (p=0.04), Mother´s and father´s level of education(p=0.05) Table 4.

History of family infected (p=0.004), Source of water in house (p=0.04).

Table 5: Educational Performance distribution of soil-transmitted helminthes among the primary schools children in Shikan locality (N=383).

Variable	Number Examined	Normal n(%)	Infected n (%)	P-value
educational performance				
Yes	127	0 (0%)	127 (100%)	.010
NO	256	237 (92.6%)	19 (7.4%)	

Multivariate analysis was calculated for variables that showed significant association in bivariate analysis. between worms infection and Educational Performance (p=0.01) (Table 5).

DISICUSSTION

The overall prevalence rates of STHs were 38.1% in which ascariasis was found to be the most prevalent represented 45.9%, followed by hookworm infection (29.5%) and lastly T.trichuriasis (19.9%), Also, (4.1%) of the pupils were infected by more than one species of soil-transmitted helminthes, our results were with the previous study conducted in El dhayga, Central Sudan among primary school children found the ascariasis prevalence rates of 32.5%. Ascaris lumbricoides with than what we recently observed among schoolchildren in eastern

Sudan (*Abdel-aziz et al. 2010*), or even higher than what was reported among children in Kassala, eastern Sudan(Abdel-aziz et al. 2010). prevalence of STH was also reported as high at 7.8% in Southern Kordfan (Abou-Zeid *et al. 2012*). In Southern Sudan The main STH species was hookworm, ranging from 0 to 70% in Southern Sudan*(Hugh. et al. 2009)*, An earlier study of Malaysia reported that the overall prevalence of ascariasis, trichuriasis and hookworm infection were 62.9%, 91.7% and 28.8% respectively (Noor Azini et al, 2007), However, observations in other parts of the world have recorded that A. lumbricoides and hookworm infections are more common than T. trichiura infection. The higher prevalence rate of trichuriasis was also observed in previous studies(*Sinniah et al, 2012*, *Al-Mekhlafi*, e*t al 2006*).

Literature has reported that high prevalence rates persist after infancy through to adulthood with heavy worm burdens are found mainly among children(*Elkins et al, 1986, Bundy et al. 1987*). A study done by (*Noor Azian et al. 2007*) revealed that the highest infection rate was found in children aged less than 10 years old compared to other age groups even though it was not significantly different, other studies in Southern Nigeria has been observed prevalent STH in this study with a value of 45.0%. *Ogbe and Odudu(1990);(Asaolu et al. 1992);(Mafiana et al. 2002).*

High prevalence of A. lumbricoides can be due to the reason that female A. lumbricoides has a fairly high fecundity (200,000-234,000 eggs / day; and hence numerous eggs, and A lumbricoides eggs are very resistant to harsh environmental conditions and air-borne. They may account for the ubiquitous nature of egg distributions and hence very high prevalence in all the age groups.

On the studies have reported a higher prevalence of infection in males than females, this simalir to Several of studies(*Quihui et al. 2006), (Nasiri et al. 2009)*, On the other hand, the observation that males were more infected than females is in line with the reports of (Uneke *et al., 2009*), Adeyeba and Akinlabi,(2002), (Oguany *et al., 2013*).

On the studies have reported prevalence of infection in all the school of participated STH infection can occur in the entire community or in a few individuals as clusters. In this study, the prevalence of STH across schools were noted, suggesting a strong cluster effect. In an Ethiopian study, it was hypothesized that the in prevalence among different communities

might be associated with environmental sanitation, water supply, and the socio-economic status of the households (*Anderson et al. 1993*).

Height-for-age based anthropometric measurements in children are important tools for gauging nutritional status. In this study, the overall prevalence of intestinal helminth infection was statistically different among underweight children, dangerously underweight children, and normal weight children (p= 0.00). This result is in agreement with those of previous of other studies conducted with school children in Ethiopia (Abera *et al*, 2013), (Tadesse, 2005), Egypt (Khalili, 1991), and Mexico (Quihui-Cota, 2004).

Multivariate analysis was calculated for variables that showed significant association in bivariate analysis. School setting There fore, Source of drinking water in school, Breakfast buy, washing your hands before eating and after bathroom and fingernails trimmed this habits were the most determinant risk factors for overall prevalence of intestinal helminths infection.

Moreover were wash your hands with soap and water after eating noted that un-clean hands played a vital role in the transmission of Ascariasis among school children. Toddlers also recorded high positive rates for STHs, because of the dirty environment in which they played and because contaminated hands were dipped into the mouth quite often.

The source of water in some the schools is an open water reservoir and pupils use their buckets to fetch water from reservoir directly, for washing purpose and the same bucket use in their toilets. Probably from toilet to bathroom they spread infection. Pupils used their hand to eat food without washing their hands properly. Most of them used to play within dirty and wet place in school the same attitude, eating mud, shorting fingernails especially every two weeks trimmed high prevalence which may cause penetration of prevalence of parasites among studied children as well as constant re-infection among children and in the school (Adeyeba, 2011); (Ogbe *et al., 2002*), this is generally the school age., food and braek fast are freely purchased from hawkers and frequently shared among friends. (Cabrera *et al. 1994*), *Etim et al. 2002*) and (Olsen, 2003). noted that un-clean hands played a vital role in the transmission of ascariasis among school children. Toddlers also recorded high positive rates for STHs be acquired through oro-faecal contaminated fingers. significant univariate association was identified with the presence of the fingernails trimmed tr for intestinal

helminths infection similar to studies conducted in Ethiopi [OR = 1.58 (95% CI: 1.03-2.54), p = 0.001].

On this study the promoting behavior, eating mud (75.9%) play with dirty and wet place (62.6%) which was significantly different (P < 0.05), environmental conditions such as the contamination of soil with human faeces(*Muttalib et al. 1983*) and poor sewage disposal including the use of night soil as fertiliser (*Mustafa et al. 2001*). When soil becomes contaminated, helminth eggs in the soil can be transferred to vegetables, then on to hands and then directly in the mouth(Koyabashi, 1999) or ingested by eating raw vegetables or fresh fruits (Mustafa *et al. 200*1, *Steinmann et al. 2010*) has reported that washing raw vegetables before eating them was protective against STHs. Thus, health education related to food hygiene is the main strategies in the control of trichuriasis and hookworm infection.

The study showed that all schools have sanitary latrine and there is no connection between the type of toilet and the injury, Among the respondents of pupils It was revealed that reported of knowing of parasitic STH The knowldge of parasitic soil transmitted helminthes, were *Ascaris lumbricoides*(24.5%), *Trichuris trichiura* (34.%), hookworm *spp were Ancylostoma duodenale* (24.1%) *and Necator americanus* (17.5%).

Moreover knowldge of Diseases transmitted by soil helminthes it was diarrhoea (43.6%), anemia(25.6%) Malnutrition (24%), (6.8%) All that is true. People infected with STHs may suffer from anaemia, vitamin A deficiency, growth stunting, diminished physical fitness and Other attributed to impaired intellectual performance (Bethony, 2006); (Hotez, 2011); (Ojunrongbe, 2013), (46.7%), (27.9%), (25.4%) of respondent that were reported of Transfer of infection whith Penetration of the skin, Larvae of worms and Eggs swallowed respectively, Infection may be direct or indirect through eggs and larva or secondary sources such as contaminated food, Adeyeba and Tijani, (2002); (Damen *et al., 2010*).

Among the participants was revealed that infections with helminthes STH previous were (28.2%) and (71.8%) un infections, The present study showed that were (75.9) went to the health center and Public Medical Services and sought to treatment, (24.1%) un wanted, 63.8% stool examination. It was revealed that 14.6%, 7.3%, 6.3%, number times have helminthic infections the, Once, twice, more than twice respectively and (71.8%) had not infection at all.

Among the study population was revealed that 39.2%, 31.3%, 12.5%, 9.1% and (7.8%) of respondent reported of knowing of symptoms, diarrhea, abdominal pain, Fever, Headache and Vomiting respectively An almost similar results were reported by (*Acka CA et al.; 2010*).

Among the participants 60.3% reported taking preventive treatment Abandazole and mebendzole, 39.9% did not take, in a study in India that 40% of mothers consulted private practitioners and 31% attended government hospitals for the worms' treatment of their children whereas in a study in Kep District, Kingdom of Cambodia 55.6% of mothers sought Private medical treatment and 22.2% sought Public Medical Services. (Natasha, 2005).

Among the participants 14%, 11.4%, 6.5%), 2.3% It was revealed that were times absent from school due to illness were Day, a week, two weeks, a month, and (61.8%). un absent had not infection at all.

Moreover Multivariate analysis was calculated for variables that showed significant association in bivariate analysis. between worms infection and Educational Performance (p=0.01), helminthes infection and effects of school performance Among 146 infected It was revealed that 86.9% reported in their deterioration level academic due to illness and 13.1% un deteriorationed, reported almost similar results to obtamed (Guayatt 2000), they noted anemia arising from STH infection is often associated with reduced work output and also impaired cognitive ability, with effects on school attendance among children. Other People infected with STHs attributed to impaired intellectual performance (Hotez, 2011); (Ojunrongbe, 2013), Globally, a lot of efforts are made to reduce STH infections, (Toan, 1998); *Gwatkin and Guillot (2000); (Montressor et al., 2002); (*WHO, 2002*); (Kabatereine et al., 2005).*

Infection can result in significant consequences for health and development, affecting growth, promoting anemia and causing some overt clinical disease, much of which is rapidly reversed by treatment (Warren et al., 1993);(Hotez et al., 2005). In addition to these impacts on health and physical development, infected school children perform poorly in tests of cognitive function; when treated, immediate educational and cognitive benefits are apparent only for children with heavy worm burdens or with concurrent nutritional deficits (*Bundy et al, 2005*). Treatment alone cannot reverse the cumulative effects of lifelong infection nor compensate for years of missed learning, but studies suggest that children are more ready to learn after treatment for worm infections and may be able to catch up if this learning potential is exploited effectively in the classroom. In Kenya treatment reduced absenteeism by one

quarter, with the largest gains for the youngest children who suffered the most ill health Miguel and Kremer(2004).

Majority of the education level of a child's mother had a positive association with intestinal helminths infection children were infected with intestinal helminths had either illiterate or primary school education level; i.e., prevalence of intestinal helminths was lower in children whose mothers had high levels of education, and this might be one of factors that attributed to inability to associate worm's infection with the symptoms or being unaware of the preventive measures. The above observation was common conducted with schoolchildren in Ethiopia (*Abera et.al 2013*) India and similar observations have been reported in other countries. (Stoll, 1989, Pullan, 2014).

There were significant associations observed between worms infection and History of family infected (p=0.004), Source of water in house (p=0.04) and existence of animals in house.

Results prevalence was higher of Tribe participants were falata (60.7%) Bideriya (52.1%) Kababish(46.7%), Arab nomads (44.4%), DrHamid (35.7%) Guamaa (34.6%), Hamr(34.3%), Galia (23.%), Alhoawir(22%) and Others (16%) show figure 32, thise reported releted to poor people and poor areas are expected to have higher worm load, than urban area, because of the preponderance of those factors that perpetuates the continued existence of the worm, such as poverty, poor environmental hygiene, and complete absence of municipal services. similar observations have been reported in other countries Poor environmental sanitation in communities, improper disposal of waste, like human feces and other organic wastes, gross environmental pollution with agrochemical and industrial waste and the steady contamination with water and air. poor people and their children are living under the risk environments and are highly exposed to intestinal helminths infection throughout their life, further a wrong idea about the spread of worm infection may leave children openly vulnerable. with living under low socio-economic conditions in the poor areas where poor sanitary system to be exist are at higher risk of worm infestation.

CONCLUSION

The study revealed high prevalence of STH infection among school children consequent with poor higen practices and unsafe water and food sources. The high prevalence calls for public deworming treatment as recommended by the WHO. This study highlights the need for periodical school de-worming interventions to control child morbidity associated with STH

infections. Appropriate health education along and de-worming interventions are recommended to reduce worm burden among schoolchildren in Sudan.

Recommendation

Based on the finding from this study we recommended to the health authorities

1- Ministry of health and Ministry of Education

- provision of safety drinking water and environment sanitation.

- Increase the awareness to word personal hygiene and food safety among student and school staff and community

2. Ministry of health to intervention, Abndazole treatment and antihementic.

3. Federal Ministry of health (FMOH) To make collaboration and partnership to civil societies, social welfare, NGO and political commitment

4- Further research should be conducted longitudinal studies the effect of disease, 4-

5- Further research should be conducted by using both subjective and objective measurement.

REFERENCES

1. World Health Organization. (2004). Prevention and control of schistosomiasis and soil-transmitted helminthiasis. Joint statement. WHO/CDS/CPE/PVC9. WHO, Geneva, 1-4.
2. Gamboa MI, Basualdo JA, Kozubsky L, Costas E, Cueto Rua E, Lahitte. (1998). HB Prevalence ofintestinal parasitosis within three population groups in La Plata, Argentina. Eur J Epidemiol., 14: 55-61.
3. Bethony, J. et al. (2006). Soil-transmitted helminth infections: ascariasis, trichuriasis and hookworm. Lancet., 367: 1521–1532.
4. Phiri K, Whitty CJ, Graham SM, Ssembatya-Lule G. (2000). Urban/rural differences in prevalence and risk factors for intestinal helminth infection in southern Malawi. Ann Trop Med Parasitol., 94: 381-387.
5. Nokes C and Bundy DAP. (1994). Does helminth infection affect mental processing and educational achievements? Parasitol Today., 10: 14-18.
6. Dickson R, Awashi S, Williamson P, Demellweek C, Garner P. (2000). Effect of treatment for intestinal helminth infection on growth and cognitive performance in children: systematic review of randomized trials. BMJ., 320: 1697-1701.
7. Tadesse Z, Hailemariam A, Kolaczinski JH(2008). Potential for integrated control of neglected tropical diseases in Ethiopia. Trans R Soc Trop Med Hyg., 102: 213-214.

8. Montresor A, Crompton DWT, Gyorkos TW, Savioli L. (2002).Helminth control in school-age children: a guide for managers of control programmes. Geneva, WHO., 26-34.
9. World health organization.(2006). Preventive chemotherapy in human helminthiasis: coordinated use of anthelmintic drugs in control interventions. A manual for health professionals and programme managers. Geneva, WHO.
10. World Health Organization. (2010). Working too vercome the global impact of neglectedtropical diseases, First WHO report on neglected tropical diseases, 1: 135 –140.
11. Saathoff E, Olsen A, Kvalsvig JD andAppleton CC. (2004).Patterns of geohelminth infection, impact of albendazole treatment and re-infection after treatment in schoolchildrenfrom rural KwaZulu-Natal/South-Africa, BMC. Infectious Diseases., 4: 27.
12. Andrade C, Alava T, De Palacio IA, DelPoggio P, Jamoletti C, Gulletta M, Montresor A. (2001). Prevalence and Intensity of Soil-transmitted Helminthiasis in the City of Portoviejo (Ecuador), MemInst Oswaldo Cruz, Rio de Janeiro., 96(8): 1075-1079.
13. Montresor A, Crompton DWT, Hall A, Bundy DAP and Savioli L.(1998). Guidelines for the Evaluation of Soil-Transmitted Helminthiasis and Schistosomiasis at community level. WHO/CTD/SIP/1.
14. Abdel-aziz M.A et al. (2010) Intestinal protozoa and intestinal helminthic infections among schoolchildren in Central Sudan., 292-293.
15. Abou-Zeid et al.(2012). Schistosomiasis and soil transmitted helminths among an adult population in a war - affected area, SouthernKordofan state, Sudan. Parasites & Vectors, 5: 133.
16. Hugh J. W. Sturrock. et al. (2009), Integrated Mapping of Neglected Tropical Diseases: Epidemiological Findings and Control Implications for Northern Bahr-el-Ghazal State, Southern Sudan, 2009; 10.1371/journal.pntd.0000537
17. de Silva, S. Brooker, P.J. Hotez, A. Montresor, D. Engels, L. Saviol .i(2003).
18. Soil-transmitted helminth infections: updating the global picturerends Parasitol, 19: 547-551.
19. WHO.(2013). Assessing the efficacy of anthelminthic drugs against schistosomiasis and soil-transmitted helminthiases. Geneva: World Health Organization.
20. Ziegelbauer K, Speich B, Mäusezahl D, Bos R, Keiser J, Utzinger J. (2012) Effect of sanitation on soil-transmitted helminth infection: systematic review and meta-analysis. PLoS Med., 9: e1001162.
21. Noor Azian, M. Y. et al (2007). Prevalence of intestinal protozoa in an aborigine community in Pahang, Malaysia. Trop Biomed., 24: 55–62.

22. Kang, G. et al.(1998). Prevalence of intestinal parasites in rural Southern Indians. Trop Med Int Health., 3: 70–75.
23. Brooker, S. et al. (1999).The epidemiology of hookworm infection and its contribution to anemia among pre-school children on the Kenya coast. Trans R Scop Trop Med Hyg., 93: 240–246.
24. Lwambo, N. J. et al. (1999) Pattern and concurrent hookworm infection and schistosomiasis in schoolchildren in Tanzania. Trans R Soc Trop Med Hyg., 93: 497–502.
25. Sinniah, B. et al. (2012) Determining the prevalence of intestinal parasites in three Orang Asli (Aborigines) communities in Perak, Malaysia. Trop Biomed., 29: 200–206.
26. Al-Mekhlafi, M. S. et al.(2006). Prevalence and distribution of soil-transmitted helminthiases among Orang Asli children living in peripheral Selangor, Malaysia. Southeast Asian J Trop Med Public Health., 37: 41–47.
27. Elkins, D. B., Haswell-Elkins, M. & Anderson, R. M.(1986). The epidemiology and control of intestinal helminthes in the public at lake region of southern India. Study design and pre and post-treatment observation on Ascaris lumbricoides infection. Trans R Soc Trop Med Hyg., 80: 744–792.
28. Bundy, D. A. P. et al.(1987). Age related changes in the prevalent and intensity of Trichuris trichiura in a St. Lucia community. Trans R Soc Trop Med Hyg., 81: 85–89.
29. Ogbe, M.G. and L.A. Odudu, 1990. Gastro - intestinal helminthiasis in primary schools in Epe Local Government Area, Lagos State, Nigeria. Nigerian J. Parasitol, 9 - 11: 95–106.
30. Asaolu, S.O., C.V. Holland, J.O. Jegede, N.R. Fraser, R.C. Stoddard and D.W.T.(1992). Crompton. The prevalence and intensity of soil transmitted helminthiases in rural communities in Southern Nigeria Ann. Trop. Med. Parasit, 86: 279–89.
31. Mafiana, C.F., M.B. Sodipe and B.I. Koleoso, (1998). Soil transmitted helminth parasites of humans in a city in south western Nigeria Helminthologia, 35: 203–8.
32. Quihui, L. et al.(2006). Role of the employment status and education of mothers in the prevalence of intestinal parasitic infections in Mexican rural schoolchildren. BMC Public Health., 6: 225–232.
33. Nasiri, V. et al.(2009). Intestinal parasitic infections among ingabitants of Karaj city, Tehran province, Iran in 2006–2008. Korean J Parasitol., 47: 265–268.
34. Uneke C.J., Nnachi M.I. and Arua U.(2009). Assessment of polyparasitism with intestinal parasite infections and urinary Schistomiasisamong school children in a semi-urban area of South-eastern Nigeria. Inter. J. Health, 9: 1.

35. Adedayo, O. and Akinlabi, A.(2002). Intestinal parasitic infections among primary school children in a rural community South-West Nigeria. Nig. J Parasitol, 23: 11 -18.
36. Oguany F.C, Okoro C.J, Okpe A.C et al. (2013). prevalence of soil transimitted helminthes infections Among public primary school pupils in Ekpoma, Edo state, Nigeria, 1(1): 30–34.
37. Anderson, T. J. C. et al.(1993). The distribution of intestinal helminth infections in a rural village in Guantemala. Mem Inst Oswaldo Cruz., 88: 53–65.
38. Abera et al.(2013). Soil-transmitted helminthes, S. mansoni, Ethiopia, J Infect Dev Ctries, 7(3): 253-260.
39. Tadesse G. (2005). The prevalence of intestinal helminthic infections and associated risk factors among school children in Babile town, eastern Ethiopia. Ethiop J Health Dev.
40. Khalili HM, Shimi S, Sarwat MA, Fawzy AF, Sorougy AO(1991) Recent study of Hymenolepis nana infection in Egyptian children. J Egypt Soc Parasitol., 21: 293-300.
41. Quihui-Cota L, Valencia ME, Crompton DWT, Phillips S, Hagen P, Daiz-Camacho SP, Tejas AT.(2004). Prevalence and intensity of intestinal parasitic infections in relation to nutritional status in Mexican school children. Trans R soc. Trop Med Hgy., 98: 653-659.
42. Adeyeba OA.(2011). Asymptomatic falciparum malaria and intestinhelminths co-infection among school children in Osogbo, Nigleria. J Res Med Sci Off J Isfahan Univ Med Sci., 16: 680–686.
43. Ogbe, M.G., E.E. Edet and M.N. Isichei. (2002).Intestinal helminth in primary school children in areas of operation of Shell Petroleum Development Company of Nigeria (SPDC), Western Division in Delta State. Nigerian J. Parasitol., 23: 3–10.
44. Cabrera, B.D., F.F. Balagtas and U.P.Manila. (1994). The role of unclean hands in the transmission of ascariasis among school children. Presented at the 15th and 16th APCO Parasitologists' Meeting, Tokyo, 1993 and 1994. Collected Papers on the Control of STH, by the APCO Group., 2: 20–37.
45. Etim, S.E., P.A. Akpan, S.E. Abeshi and O.E. Offiom.(2002). Intestinal helminth infections in children: Implications for helminth control using school based mass chemotherapy. Nigerian J. Parasitol., 23: 53–60.
46. olsen, A.(2003). Experiencewith school - based interventions against soil transmitted helminths and extension of coverage to non – enrolled children. Acta Trop, 86: 255–66.
47. Muttalib, M. A., Huq, M., Huq, J. A. & Suzuki, N. (1993). Soil pollution with Ascaris ova in three villages of Bangladesh. Asian Parasite Control Organization, Tokyo., 66–71.

48. Mustafa, U. et al. (2001). Environmental pollution with soil-transmitted helminths in Sanliurfa, Turkey. Mem Inst Oswaldo Cruz., 2001; 96: 903–909.
49. Koyabashi, A.(1999). Ascariasis: Textbook for seminar on parasite control administration for senior officers - a step towards primary health care. 233–242. (International Cooperation Agency, Japan.
50. Steinmann, P. et al.(2010). Rapid appraisal of human intestinal helminth infections among schoolchildren in Osh oblast, Kyrgyzstan. Acta Trop., 116: 178–184.
51. Acka CA, Raso G, N'Goran EK, Tschannen AB, Bogoch II, et al.(2010). Parasitic Worms: Knowledge, Attitudes, and Practices in Western Coˆ te d'Ivoire with Implications for Integrated Control. PLoS Negl Trop. Dis., 4(12): e910.
52. Natasha. S.(2005). Maternal Knowledge, attitudes and Practices concerning child health among mothers of children younger than 60 months in Kep District, Kingdom of Cambodia. Final Report.