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Co-Infection of Schistosomiasis and Helminthiasis among School-Aged Children in Kura Local Government Area, Kano State

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Abstract
Schistosomiasis and helminthiasis are serious course for concern in developing countries, especially among children; because of their effect on health economy any affected patient and the population at large. This study was a cross-sectional survey aimed to determine the co-infection of these two important groups of parasites, among primary school pupils in some communities of Kura Local Government Area, Kano State, Nigeria. Freshly produced urine and stool samples were collected from 165 apparently healthy pupils and examined using microscopic and macroscopic standard methods. Out of the 165 pupils examined, 15 (9.0%) were found to be co-infected with both groups of the parasites. About the identified parasites, A. lumbricoides was the most prevalent soil-transmitted helminths (STH) encountered, with a prevalence rate of 7.27%, followed by Hook worms (3.03%), while infection with Schistosomes revealed S. haematobium 26.7% and S. mansoni 6.7%. Males were found to be at higher risk with 60.0% prevalence rate than females that had 40.0%. Age limit of 5-6 years recorded the highest prevalence for S. haematobium, A. lumbricoides, and hookworm infections.
***Key words**: Helminthias, Schistosomiasis, co-infection, School aged, children*

INTRODUCTION

Schistosomiasis and soil transmitted helminthiasis are part of the neglected tropical diseases that affect the population that are relatively of resource poor settings, mostly overwhelmed by poverty, poor sanitary conditions, unsafe drinking water and general lack of hygiene.

Schistosomiasis (SCH) and helminthiasis are poverty-related in which school-aged children are at highest risk, *Schistosoma mansoni* infection for example, may lead to consequences such as nutritional deficiencies, anaemia, and impaired cognitive abilities of the affected person also *Schistosoma haematobium* on the other hand is an important agent for urinary tract infection leading to poor reproductive and in some cases sexual dysfunction and ultimately infertility (Montresor, 2011). The disease is also notably a risk of bladder cancer and in children may lead to anaemia and stunted growth (Hotez and Kamath 2009).

Helminthic infections belongs to the major groups of parasitic infections that affect the less privilege communities in the developing countries worldwide, with the main species causing the disease such as Whipworm (*Trichuris trichiura*), roundworm (*Ascaris lumbricoides*), and *hookworms* (*Necator americanus* and *Ancylostoma duodenale*). Some of their major complications include reduction of nutritional status, physical and mental ability impairment and lessen cognitive development especially in school-aged children (Montresor, 2011).

The preventive measures as the first line of approaches to be taken to reduce occurrence and subsequent repercussion of their morbidities include health education and improvement of environmental hygiene. This goes in line with WHO which put forward recommendations and tools for preventive chemotherapy (PC) in cases of human schistosomiasis and helminthiasis. the 54th World Health Assembly, published the Resolution WHA54.19 on SCH and STH which urge Member States to implement but not only that to also sustain successful control activities with regards to these important parasitic diseases, with minimum target to be achieved by 2010 (WHO, 2013).

Unfortunately, the goal was not realized., with progress in expanding preventive chemotherapy, for that reason, new Resolution WHA65.21 was endorsed to intensify control measures to eliminate SCH, targeting majorly school-aged children (5-14 years), with a new timeline set to treat at least 75% of school-aged children in all endemic regions by the year 2020 and hoped to reach elimination status of SCH

and STH as a public health problem (WHO According to WHO) more than 2 billion people are affected with these groups parasites SCH and STH which are regarded as Neglected Tropical Disease (NTD) and is found that schistosome alone had up to 240 million people infected yearly, leading to the disease schistosomiasis and 700 million are at risk in 74 different countries.

MATERIALS AND METHODS

Study area

The study was carried out in some selected villages (Bauren Tanko, Fegi, and Butalawa) of Kura local government area, Kano state, Nigeria. The local government has an area of 206km^2 and a population of 144,601 at the 2006 census. It lies on latitude of 11o 46' 17N and longitude of 8o 25' 49E (Ado, 2009).

Study design

The research was prospective cross sectional study.

Sample size determination

The sample size of this study was determined using the formula as follows

$$n = \frac{z^2 p(1-p)}{d^2}$$ (Cochran, 1963)

Where;

n= number of samples

z= statistic for level of confidence 95% (1.96)

p= prevalence 11% (0.11) (Aribodor *et al.*, 2018)

d= allowable error of 5% (0.05)

$$n = \frac{3.8416 \times 0.11 \times 0.89}{0.0025}$$

Sample size approximately = 150

Using 10% attrition rate, the sample size becomes 165

Study population

This includes school aged children of 3 selected villages in Kura local government, Kano state (Bauren Tanko, Fegi, and Butalawa) in which 165 participants were recruited for the study.

Ethical approval

Ethical approval to carry out the study was received from Kano state ministry of health Reference Number: MOH/OFF/797/T.1/1416.

Inclusion criteria

Primary school children who were not under any antihelminthic drugs but willing to participate in the study were included in the study.

Exclusion criteria

Primary school children not willing to participate in the study and or under anthelminthic treatment within a period of one month before the study were excluded from the study.

2016).

Sample collection and processing

Two separate clean and dry universal and wide mouth bottles were given to each participant, for urine and stool samples respectively they were instructed on how to provide the abnormal part of the stool when produced while for the urine last drops were collected.

Macroscopic examination of the collected

Urine: Colour, turbidity and blood were checked and recorded.

Stool: Colour, consistency and constituents were observed and recorded.

Urine Microscopy

Ten (10ml) of urine was poured in a clean centrifuge tube. It was spun at 2500rpm for 5 minutes. The supernatant was discarded and the deposit was taped and a drop transferred onto a clean grease free glass slide and covered gently with coverslip. It was examined under microscope with 10x and 40x objectives (Ochie, 2005).

Stool Microscopy

About a half teaspoon of faecal mass were thouroghly mixed in 10ml of water and strained through 2 layers of gauze in a funnel. The filterate was centrifuged at 2000rpm for 2 minutes. The supernatant was discarded and the sediment was re-suspended in 10ml of physiological saline. It was again centrifuged and the supernatant was discarded. The sediment was re-suspended in 7ml of 10% formal saline and allowed to stand for at least 10 minutes for fixation. To this, 3ml of ether was added. The tube was stoppered and shaken vigorously to mix. Then the stopper was removed and the tube was centrifuged at 2000 rpm for 2 minutes. The tube was allowed to rest in a stand. Four layers became visible, and the upper three layers were discarded. The plug of debris was detached from the side of the tube with the aid of a glass rod for the supernatant to be easily out of the tube. The sediment was poured on a clean glass slide, covered with a cover slip and examined using 10 and 40 X objectives (Cheesebrough, 2009).

Data analysis

The result was analyzed using statistical package for the social science (SPSS) version 20.0 software and presented in tables p value ≤0.005 was considered significant.

RESULTS

During the study, a total of 165 primary school aged children in the selected villages, of Kura Local Government Area were enrolled in the study and overall prevalence of co-infection of 15 (9.0%) was recorded.

The parasites identified in the study area were *S. hematobium* 44 (26.7%), followed by *A. lumbricoides* with 12 (7.27%), *S. mansoni* 11 (6.7%) and *hookworm* 5 (3.03%). The co-infection according to gender revealed that, males had higher prevalence rate 9(60%) compared to females 6(40%), (Table 2). The age group with highest prevalence was 7-8 (40%) and that with the least co-infection was the 5-6 (6.7%). There was also no significant difference in infection rates among different age groups examine X^2=10.756, P=0.293. According to the results also, the age groups of 11-12 had the infection rate of 26.7%, age range of 13-14 had 13.3% while the age limit of 15-16 do not have any infection, meaning, they have 0.0% infection rate.

Table 1: The different agents of schistosomiasis and helminthiasis identified

Variable the parasite (eggs)	Number examined (165)	Positive	Prevalence %	x^2	P-value
Schistosomes				36.667	0.000
S. hematobium		44	26.7		
S. mansoni		11	6.7		
Both		6	3.6		
Sub total		**61**	**37**		
STH					
A. lumbricoides		12	7.27	144.228	0.000
H. worms		5	3.03		
Sub total		**17**	**10.3**		
Total	**165**	**78**	**47.3**		

$x^{2=}$ chi square, %= percentage, P-value= probability value (≤0.05) was significant

Table 2: Distribution of co-infection of schistosome and soil transmitted helminth based on gender

Variable	Number examined	No. coinfected	Prevalence%	X^2	P-value
Gender				1.408	0.235
Male	75	9	60		
Female	90	6	40		
TOTAL	**165**	**15**	**100**		

$X^{2=}$ chi square, %= percentage, P-value= probability value (≤0.05) was significant

Table 3: (Co-infection of schistosomes and soil transmitted helminthes based on age-groups)

Variable	Number examined	Positive	Prevalence %	x^2	P-value
Age				10.756	0.293
3-4	1	0	0		
5-6	20	1	6.7		
7-8	52	6	40		
9-10	32	2	13.3		
11-12	24	4	26.7		
13-14	22	2	13.3		
15-16	14	0	0		
Total	**165**	**15**	**100**		

Note: $x^{2=}$ chi square, %= percentage, P-value= probability value (≤0.05) was significant

DISCUSSION

Soil transmitted helminths are among the neglected tropical diseases affecting less privilege across the globe. In this study, the following organisms were identified, *Schistosoma mansonii* 11(6.7), *Schistosoma haematobium* 44(26.7), *Ascaris lumbricoides* 12(7.3) and *Hook worm* 5(3.0). Inocencio *et al*. (2017), was also able to identify different parasitic species which includes; two schistosomes and two soil transmitted helminth while *Trichuris triciura* replaces *Hookworm* in their study; The parasites and their respective frequencies were 47(17.%), 11(4.2%) and 49(18.7%) for *Schistosoma mansonii*, *Tichuris Trichiura* and *Ascaris lumbricoides* respectively. Agersew *et al*. (2016), in a work on Schistosomes and soil-transmitted helminths among school-aged children in Chuahit, Dembia district, Northwest Ethiopia, concerning

prevalence, intensity of infection and associated risk factors, was able to identify *Schistosoma mansonii*, *Hookworm*, *Trichuris trichiura* and *Ascaris lumbricoides* in their research, with *Ascaris lumbricoides* the dominant parasite having 77(19.2) as prevalence rate, while 45(11.2), 9(22), 7(1.7) were the identification rates for *Schistosoma mansonii*, *Hook worm* and *Trichuris trichiura* respectively.

The distribution of the parasite according to gender showed that males were more affected than the females participants with 9 (60%) and 6(40%) for females participants respectively. This is in agreement with the work of Oluwarotimi *et al*. (2019) who also identified males subjects as the participants with highest infection rate, although with higher percentages 33(18.0%) and 29(13.6%) respectively. With respect to age groups, the age bracket of 7-8 was found to have higher infection rate 6(40.0%) compared to the rest of the groups, followed by 11-12 with 4(26.7%) while 5-6 had only 1(6.6%) as the least infected age group. Oluwale *et al*. (2018), however, in Ogun state, Nigeria, reported almost same identification frequencies for three different age groups but with slightly higher rate in the age range of 10-12 with (39.5%) followed closely by 13-15 and 8-10 that had (38.9%) and (38.33%) as their identification frequencies respectively.

CONCLUSION

It can be concluded therefore that school aged children are prone not only to schistosomiasis but also the soil transmitted helminth in the study area.

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Conflicts of interest:

There is no conflict of interest among the authors.

REFERENCES

Ado-Kurawa, I. (2009). Geography and history of Kano in the three years of good Governance of shekarau stewardship in Kano state. *Research and Documentation Directorate,* Government House, Kano.

Agersew, A., Yalewayker, T., Demekech, D. and Mulugeta, M. A. (2016). Schistosoma mansoni and soil-transmitted helminths among preschool-aged children in Chuahit, Dembia district, Northwest Ethiopia: prevalence, intensity of infection and associated risk factors; BMC Public Health 16:422

Aribodor, D., Obikwelu, M., Ekwunife, C., Egbuche, C., Ezugbo- Nwobi, I., Etaga, H. (2012). Preliminary investigation on soil-transmitted helminth infections in rural communities in Anambra state, Nigeria. *Journal of Life Science*;**6**(4)238:234-238

Cheesbrough, M. (2009). District Laboratory Practice in Tropical Countries, Part 2, 2nd edition. *Cambridge University press*, New York, USA.

Cochran, W.G. (1963). *Sampling techniques*, (3rd edition).Wiley. New York. John Wiley & Sons, Inc. P.75

Hotez, P. J. and Kamath, A. (2009). Neglected tropical diseases in sub-Saharan Africa: review of their prevalence, distribution, and disease burden. PLoS Negl Trop Dis. **3**(8):412-413

Inocencio, R., da Luz, S., Linsuke, P., Lutumba, E., and Hasker, M. B. (2017). Assessment of schistosomiasis and soil-transmitted helminths prevalence in school-aged children and opportunities for integration of control in local health services in Kwilu Province, the Democratic Republic of the Congo; Tropical Medicine and amp; International Health; 22:11

Montresor, A. (2011). Lutte Contre les Helminthiases Ches les Enfants D'âge Scolaire. 2nd edn. World Health Organisation: Genève; 2011

Ochie, J., and Kolhatkhar, A. (2005). Laboratory techniques in mycology examination of sputum. Medical laboratory science, theory and practice. New Delhi, India: Tata McGraw Hill Publishing Co. Ltd.; Pp.105–33.

Oluwarotimi, A. O. and Ifeanyi, E. O. (2019). Prevalence and Intensity of Soil Transmitted Helminths among School Children in Ifetedo, Osun State, Nigeria; Journal of Bacteriology and Parasitology; **10**(1):56-62

Oluwole, A. S., Adeniran, A. A., Mogaji, H. O., Olabinke, D. B., Abe, E. M., Bankole, S. O., Sam-Wobo, S. O., Ekpo, U. F. (2018). Prevalence, intensity and spatial co-distribution of schistosomiasis and soil transmitted helminths infections in Ogun state, Nigeria. Parasitology **4**(8):1–9.

World Health Organization. (2012). Soil-transmitted helminthiases: eliminating as public health problem soil-transmitted helminthiases in children: progress report 2001–2010 and strategic plan 2011-2020. 2012.