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The impact of health education on the prevalence of helminthosis in primary school children in Zaria, Kaduna State

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ABSTRACT

A study was undertaken to determine the impact of health education in addition to medical treatment of helminthosis among school children in Zaria. A total of 1,204 children from ages 6 to 12 years comprising 612 males and 592 females were examined. The study was conducted between March 2007 and February 2009. Faecal samples were collected from the children in 20 randomly selected primary schools. The samples were processed using the formal ether concentration techniques. Of the 1,204 children examined, 690 (57.3%) of the study population were infected with helminthes. The 690 infected pupils were de-wormed and divided into two groups comprising 345 each in a group. One group was given health education talks once every week while the other group was left without any health education talks for three months from November, 2008 to February, 2009 after which the incidence of helminthosis was determined among them. The study showed a decrease in infections from 16.8% to 2.3% among children who received health education in addition to medical treatment. This decrease was significant ($t = 5.21$, $p < 0.05$) in comparison to the decrease shown among children who did not received health education talks. This study therefore showed that educating high risk individuals played a key role in reducing the incidence and prevalence of helminthosis among primary school children.

INTRODUCTION

Helminthosis is an infestation due to helminthes [1,2]. Helminthosis is endemic in many parts of the world, and constitute a major disease burden among children in developing countries especially in Sub-Saharan Africa [3]. Certain factors have also been observed to affect not only the prevalence of helminths infection in school children but enhance re-infections [4]. These factors include poor sanitary conditions of environment ,indiscriminate excretion leading to

faecal contamination of food ,water and soil (temperature and humidity) which determines the viability and maturation of eggs of pathogenic helminths [5,6].

In Nigeria, in spite of Government's effort in providing clean drinking water (especially in urban areas) and the mounting of regular sanitation exercises, the prevalence of these parasites still remains high especially in children [7,8]. Lack of adequate attention to the disease accounts for the high incidences in children especially in Nigeria where about 70% of school children are enrolled in primary school [9,10,11]. Parasitic infection poses serious health problems where diseases, ignorance, poverty and inadequate healthcare are interwoven [7,8].

MATERIALS AND METHODS

The study area comprised Zaria City, Sabon Gari, Tudun Wada, Kongo, Wusasa, Palladan, Kwangila, Gaskiya and Samaru all located in Zaria, Kaduna State. Zaria is 83km North of Kaduna. It is located between longitude $7^{o}4''$ East and latitude $11^{o}6''$ North of the Equator [12]. In the northern guinea savannah vegetation area where Zaria is located, there are distinct wet and dry seasons. The study population comprised children of ages 6-12 years. A total of 1204 samples were obtained from twenty randomly selected primary schools. Briefly, the names of schools in a particular location in Zaria were first written on pieces of paper then, placed in a bag and properly shaken. Faecal samples were obtained from pupils listed on the pieces of paper contained in the bag. Similarly, randomization technique was also used for the selected schools. About 10% of the pupils in a particular area of the classes were randomly selected [13]. A total of twenty primary schools were randomly selected for the study.

Collection of samples

About 1g stool samples were obtained from each pupil of the selected school primary schools. Prior to sampling, the headmaster/headmistress of various schools were contacted and briefed on the purpose of the research. Pre-sampling of the pupils was done to sensitize them into obtaining their maximum cooperation.

The samples were obtained at random. In each class, samples were obtained from 10% of the pupil. This was done by writing "yes" on sheets of papers and "No" on the remaining papers. Pupils that picked "yes" in every class were given a letter to take to their parents seeking their consent and cooperation to collect their children's stool.

RESULTS AND DISCUSSION

The association of prevalence of helminthosis with sex varied from school to school. The prevalence was significantly associated with the male sex in seven schools and with the female sex in four schools (Table 1). The associations with either sex was insignificant in 5 schools while odds ratio could not be determined in four schools due to absence of negative or positive in one of the sexes in each case. The overall association of prevalence of Helminthosis for all the schools was with the male sex but the association was not significant (OR = 4.23, p = 0.085).

The prevalence of infection among males in the schools was higher than among females (Table 1) because the males engage in more outdoor activities than the females whose leisure hours are strictly controlled [14].

The prevalence of helminthosis by age group in years showed that the age group 9-10 years recorded the highest prevalence rate of 63.1% followed by ages 5-6 years with 61.4% (Table 3). The prevalence age groups was associated with ages 5-6 years (OR = 1.41) and 9-10 years (OR = 1.32). However, the association was significant only with age group 5-6 years ($p < 0.05$).

The age group 9-10 years was the most infected followed by 5-6 years. The high prevalence in age 9-10 and 5-6 years could be attributed to the fact that children at this stage are not mindful of the health risk that is associated with playing in contaminated environment and they often spend their leisure time outdoors playing. They are often in contact with soil and are fond of eating indiscriminately with unwashed hands [8]. The low prevalence in age 11-12 could be attributed to the fact that as a child gets older; the child tends to be more cautious of his habits and may not get always get involved in playing in dirty environment [15]. However, the decrease of infection in age group 7-8 could be by coincidence. This could be due to a reduction in the rate of exposure of this age group to the helminthes [16].

All infected pupils identified during the prevalence study were included as part of the study. Of the total of 690 infected pupils, 366 were males and 324 were females. These were all de-wormed and divided equally into two groups (345 pupils in each group). One group was given health education talks once every week while the other group was left without any health education for a period of 3 months (November 2008 – January 2009) after which the incidence of helminthosis was determined. The infection rate in school children who received health education talks for a period of 3 months showed a decrease from 16.8% in the group that did not receive health education talks to 2.32%, in the group that receive health education (Table 2). This might probably be attributed to the decrease in helminth infection. This finding however is in line with the report conducted on child to child hygiene education in Indian and found reduction in the prevalence of Helminthosis infection in primary school children after one month[16]. This present study found a lower overall incidence of helminthosis (2.3%) compared with 13.5% found in similar study conducted in Thailand on the impact of health education programmes on the prevalence of enterobiasis in primary school children [17].

Sources of water used by pupils have been observed to be the major factor which contributed to helminth infections (Table 4). Pupils who used well water in their homes had high helminths infection. This observation is further corroborated by the results of the current study, the data obtained in the study which indicated a very significant association between sources of drinking water and prevalence of helminth infections in the school. Many wells are dug near gutters or toilets water. Water from these toilets may leak into the wells and get the well water contaminated as a potential source of infection. Most wells too are left uncovered and sometimes any kind of buckets or containers which may be carelessly left on contaminated soil are dipped into the wells to fetch water, enhancing the prospect of ingestion of helminth considerably [18,8].

Table 1: Prevalence of Helminthosis amongst Primary School Pupils in Zaria by Sex

School	**Male**		**Female**				
	No.Ex	Prev.	No.Ex	Prev.	OR	P. value	SA
L.E.A. Kwangila	30	70.0	39	41.0	335	0.031*	M
L.E.A. Ganga Uku	31	69.7	27	92.6	5.95	0.045*	F
L.E.A. Sabon Gari	40	65.0	56	46.4	2.14	0.111	M
L.E.A Gyellesu	34	29.4	26	84.6	18.2	0.00006*	F
L.E.A Aminu, Sabon Gari	30	60.0	22	79.3	2.27	0.3111	F
St. Bartholomew Wusasa	10	80.0	11	100	-	-	-
Juddy Nursary/Prim. School Sabon Gari	10	80.0	13	46.2	4.67	2.223	M
Aviation Staff School	43	41.9	26	80.8	7.00	0.00001*	F
Total Child Samaru	10	100	10	20.0	-	-	-
ABU Staff School Kongo	40	65.0	56	21.4	6.81	0.00004*	M
Bello Aliyu Kofan Doka	30	33.3	23	52.2	2.18	0.272	F
A.B.U. Staff Sch. Samaru	25	68.0	35	39.7	3.6	0.036*	M
Faith Primary School Kongo	26	61.5	20	-	-	-	-
Sani Adamu L.E.A. Gaskiya	60	33.3	36	72.2	5.20	0.00049*	F
Nuhu Bamali Poly	17	82.4	20	45.0	5.70	0.046*	M
Sarki Sambo L.E.A	31	80.6	32	25.9	10.65	0.00009*	M
Salem Model School Zaria City	28	82.1	18	55.6	3.68	0.105	M
Saidu L.E.A Samaru	59	89.5	60	36.0	15.79	0.0000*	M
Baba Ahmed L.E.A T/Wada	37	21.6	32	100	-	-	-
L.E.A Palladan	23	69.6	80	33.3	4.57	0.019*	M
Total	**612**	**59.8**	**592**	**54.7**	**4.23**	**0.085**	**M**

*S. A = Sex association *Significant*

Table 2: Effect of Health Education on the Incidence of Helminthosis in Treated Primary School Pupils in Zaria

	Age group	**Without Education**			**With education**		
		No.Ex	No.+ve	Inc	No.+ve	No.+ve	Inc
Male	4.5-6.5	106	23	21.70	106	3	2.83
	6.5-8.5	42	11	26.19	42	2	4.76
	8.5-10.5	23	3	13.04	23	0	0.00
	10.5-12.5	12	1	8.33	12	0	0.00
	Total	183	38	20.77	183	5	1.64
		t=3.66			P<0.035		
Female	4.5-6.5	82	23	13.41	82	2	2.43
	6.5-8.5	45	5	11.11	45	1	2.22
	8.5-10.5	24	3	12.50	24	0	0.00
	10.5-12.5	11	1	9.09	11	0	0.00
	Total	162	32	12.35	162	3	1.85
		t =8.96			P<0.001		
Grand total	4.5-6.5	188	46	18.09	188	5	2.60
	6.5-8.5	87	16	18.39	87	3	3.45
	8.5-10.	47	6	12.17	47	0	0.00
	10.5-12.5	23	2	8.69	23	0	0.00
	Total	345	70	16.81	345	8	2.32
		t =5.21			p<0.014		

Table 3: Prevalence of Helminthosis amongst Primary School Pupils in Zaria by Age Group

Age group (years)	Number Examined	Number positive	Prevalence (%)	Odds ratio	p-value
4.5– 6.5	614	377	61.4	1.41	0.004*
6.5-8.5	350	174	49.7	0.65	0.0008
8.5-10.5	149	94	63.1	1.32	0.151
10.5-12.5	91	45	49	0.71	0.142
Total	1204	690	67.3		

**significant association*

Table 4: Prevalence of Helminthosis amongst Primary School Pupils in Relation to Sources of Water

Sources of water	Number Examined	Number positive	Prevalence	Odd ratio	p-value
Well	407	270	66.3	1.77	0.000008*
Tap	720	390	54.2	0.72	0.0085
Pond	4	2	50.0	0.74	0.833
Stream	11	5	45.5	0.62	0.622
Borehole	62	23	37.1	0.42	0.0015
Total	1204	690	57.3		

CONCLUSION

The study revealed that out of 1.204 children examined, 690 had Helminthosis. Following the medical treatment and supplementary health education the infected children received , the incidence of helminthosis was significantly reduced from 16.8% to 2.3%. The study therefore conclude that educating high risk individual such as in the current study, played a very significant role in reducing the incidence and prevalence of helminthosis amongst school children in Zaria.

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