ORIGINAL ARTICLE

AFRICAN JOURNAL OF CLINICAL AND EXPERIMENTAL MICROBIOLOGY
AJCEM/2007013/2717
COPYRIGHT 2007
AFR. J. CLN. EXPER. MICROBIOL.8(2): 107 – 113

MAY 2007 ISBN 1595-689X VOL8No 2
http://www.ajol.info/journals/ajcem

INTESTINAL HELMINTHIASIS IN CHILDREN IN A SUBURB OF LAGOS, NIGERIA: EVALUATION OF RISK FACTORS AND HABITS

*ONWUAMAH CK, *OKWUZU JO, *IDIKA N, *MESHACK E AND *GBAJABIAMILAA T.

*Nigerian Institute of Medical Research, 6 Edmond crescent, P.M.B 2013, Yaba 101011, Lagos, Nigeria.

Correspondence: Email chikaonwuamah@yahoo.com.

Abstract

Various risk factors have been known to predispose children to intestinal helminths infections. We evaluated the impact of multisectoral risk factors on infection prevalence in school children using questionnaire and stool examination.

Pupils' hawking habits, schools, classes, antihelminthic prophylaxis, parents' occupation and mothers' educational status were the significant risk factors identified. Logistic regression identified four of the aforementioned factors, age, sex, disposal of excreta and/or septic tanks overflow into open drainages as factors influencing prevalence in this population. Irregular deworming probably reduced the effect of prophylactic use of antihelminthic on prevalence. Hawkers (odds ratio = 3.78) and pupils living in faeces contaminated environs were identified as at risk groups.

Public enlightenment campaigns on worms' infestation control strategies, including the reduction of environmental contamination with faeces should reduce intestinal helminthiasis in these children.

Key words: Intestinal helminths, risk factors, risk habits, hawking.

INTRODUCTION

Infection with intestinal helminths is a common problem amongst children in the tropics. Children are easily infected and re-infected because of their habits, personal and community hygiene. Severe infections may lead to bowel perforations and severe malnutrition as worms can deplete up to 60% of the nutrition supply of children (1, 2). It has been reported that 1 in every 3 Nigerian children is infected and 60% of Nigerian mothers do nothing to prevent these worms' infections (3). This report informed this survey conducted in Lagos Mainland local government area (LMLGA) to identify at risk groups and risk factors that influence infection prevalence among school children within the LMLGA. Such predisposing factors or habits could be targeted for change through advocacy while at risk groups could be targeted for treatment. Risk factors and habits evaluated include individual, familial and community variables, consistent with the current multisectoral approach to the control of intestinal helminthiasis (4,

5, 6).

MATERIALS AND METHODS

Lagos Mainland local government area is located in the heart of Lagos state, Nigeria. Attending a school within the LMLGA and being aged 6-16 years were the study inclusion criteria. Private and public schools were equal among the 6 randomly selected schools. Informed consent was obtained from the LMLGA, the school authorities and the students. Information on individual, familial and community hygiene were obtained using questionnaire. Stool samples were collected from 177 consenting pupils. The Formol-Ether concentration method was used for stool examination (7). Data was analyzed using Epi Info 2002 and the graph drawn with Microsoft Excel 2000 package. Univariate (Chi square test) and multivariate (logistic regression) analyses were conducted to define associations between risk factors or habits and the prevalence of infection.

RESULTS

Sex and age: Out of the 177 students recruited for the study, 72 were females and 105 were males. Amongst these, 87 students (49.2%) made up of 38 females and 49 males were infected. The influence of sex on prevalence was not statistically significant (p= 0.215) though prevalence was 6.1% higher in females (odds ratio = 1.28 [95% CI: 0.70-2.33]). Prevalence according to age was not significant (p= 0.12) but ages 10 and 9 were the most infected.

School and class: Infection was 36.8% higher in public schools than in private schools (p= 0.000). The distribution of infection across the classes was statistically significant (p= 0.007) with primary 4 pupils infected the most (age: mean = 10.24, range = 8-16, median = 10 and mode = 9).

Personal habits and hygiene: Children who took their bath once daily were more infected (56.2%) than those who took their bath twice (47.6%) and thrice (50.0%) daily (p= 0.69). Hands washing after toilet use and walking barefoot had an insignificant effect on infection. Infection was higher in pupils who washed their hands before eating (p= 0.003). From the study, 22.0%, 69.5%, 5.6% and 2.8% of the pupils used pit, water systems, bucket and other toilet facilities respectively, with an insignificant influence on prevalence (p= 0.147). Patronizing food vendors had an insignificant effect on prevalence (p= 0.44, odds ratio= 1.06 [95% CI: 0.54-2.07]). The difference in prevalence amongst hawkers (75%) and non-hawkers (44.2%) was statistically significant (p= 0.003) (table 1).

Sources and treatment of drinking water: Their sources of drinking water included pipe-borne water (81.4%), borehole (14.7%), well (3.4%) and stream (0.6%). Half of those who drank pipe-borne water were infected. Prevalence in those who 'boiled', 'filtered', 'boiled and filtered' and 'didn't treat' drinking water was not significantly different (p= 0.62) though prevalence was 19% lower in pupils who boiled and filtered drinking water.

Community hygiene: Eighty-three percent of the study population had open drainages near their houses. Of these, 21.8% dispose excreta into the drainage, 33.6% had septic tanks overflowing into the drainage and 33.8% confirmed that water pipelines transverse those drainages. Both means of faecal contamination had no significant effect on the prevalence, but on the

average the risk of infection was 10% higher in pupils living in such environs.

Enlightenment: The effect of both parents' occupation on prevalence was statistically significant (fathers' p= 0.005, mothers' p= 0.01), while only that of their mothers' educational status was significant (fathers' p= 0.086, mothers' p= 0.046) (fig 1).

Use of antihelminthics: Thirty-three percent of pupils had never ever taken antihelminthic drugs. Their reasons were ignorance of drug availability though knowledgeable about worms (61.1%), 'did not like worm medicines' (7.4%) while 31.5% did not know about worms. Pupils' major reasons for taking antihelminthic drugs were stomach ache (29.9%), presence of worm in stool/vomit (11.9%) and routine medication (7.3%). Forty-three percent of antihelminthic users were infected while 61.0% of non-users were infected (p= 0.014). 7 out of 13 pupils who took drugs months before the study and 25 out of 60 who took drugs the previous year were infected.

Table 1: Univariate association of some risk factors and habits with intestinal helminthiasis

Risk factors / habits		% Infection	[a]Odds ratio (95% CI)	P – values
Use of Antihelminthics	Have used	43.2	0.486 (0.257 – 0.920)	0.014*
	Never used	61.0		
Hawk?	Yes	75.0	3.780 (1.420 – 10.080)	0.003*
	No	44.2		
Fathers' education	Educated	46.0	0.210 (0.020 – 1.960)	0.086
	None	80.0		
Mothers' education	Educated	45.2	0.310 (0.08 – 1.220)	0.046*
	None	72.7		
Fathers' occupation	Low skilled	56.8	2.630 (1.260 – 5.480)	0.005*
	Professional	33.3		
Mothers' occupation	Low skilled	54.8	2.340 (1.110 – 4.910)	0.012*
	Professional	34.1		
School	Private	32.3	0.210 (0.110 – 0.400)	0.000*
	Public	69.1		
Hand washing always before food?	Yes (n = 160)	51.9	6.470 (1.400 – 29.830)	0.003*
	No (n = 14)	14.3		
Faecal disposal into open drainages?	Yes	56.2	1.500 (0.680 – 3.310)	0.159
	No	46.1		
Septic tank overflow into drainages?	Yes	55.1	1.540 (0.770 – 3.080)	0.113
	No	44.3		

**Significant values asterisked (p. < 0.05). [a]Odds ratios apply to the first risk factor/habit option.*

Table 2: Multivariate association of risk factors and habits with intestinal helminthiasis

Risk factors	Odds Ratio	95% C.I.	Coefficient	P-Value
Age	1.0557	0.8134 - 1.3701	0.0542	0.6837
Dispose excreta? (Yes/No)	1.1475	0.3769 - 3.4930	0.1376	0.8086
Drugs? (Yes/No)	0.6365	0.2241 - 1.8075	-0.4518	0.3962
Hawk? (Yes/No)	1.6453	0.4905 - 5.5186	0.4979	0.4200
Mother Educated? (Yes/No)	0.8654	0.1622 - 4.6174	-0.1446	0.8656
Mother's occupation (Low skilled/Professional)	2.1615	0.6424 - 7.2732	0.7708	0.2131
Schools (Public/Private)	3.3560	1.1802 - 9.5428	1.2107	0.0232
Septic overflow? (Yes/No)	1.3801	0.5102 - 3.7329	0.3221	0.5257
Sex (Female/Male)	1.2741	0.4695 - 3.4579	0.2423	0.6344
CONSTANT	*	*	-1.7149	0.3508

*Significant values underlined ($p < 0.5$). *Asterisked cells not applicable. Likelihood ratio chi square test: 18.24 with 9 degrees of freedom ($p = 0.0325$).*

Pupils' hawking habits, prophylactic use of antihelminthics, parents' jobs, mothers' education, their schools and classes were the relevant statistically significant variables identified by univariate analysis (table 1). Four of these together with age, sex and the two environmental variables were included as confounders in the best logistic regression model, though only the schools attended was significant (table 2).

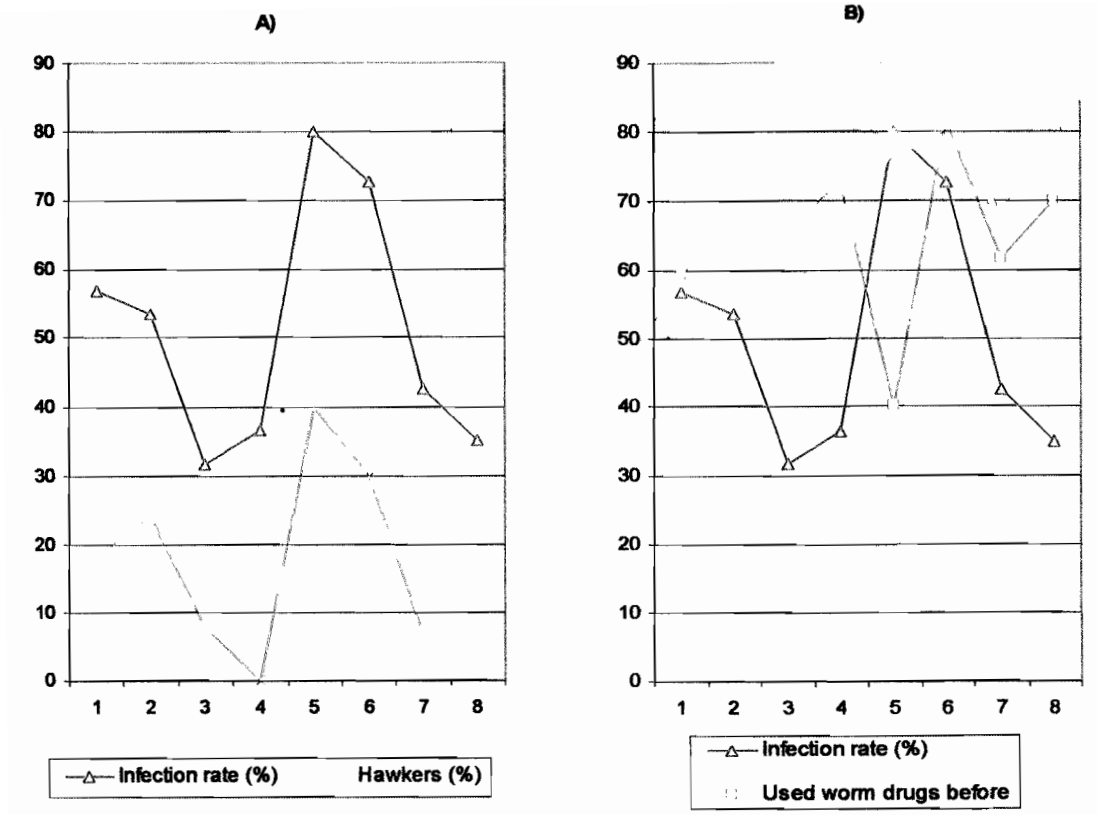

Figure 1: Hawking (A), use of antihelminthics (B), community hygiene (C) and prevalence across different group of parental educational status and occupation.

Y-axis = Positive values (%); X-axis = Groups:

1 = Trading Fathers 2 = Trading Mothers 3 = Professional Fathers 4 = Professional Mothers 5 = Uneducated Fathers 6 = Uneducated Mothers 7 = Educated Fathers 8 = Educated Mothers

DISCUSSION AND CONCLUSION

The higher prevalence in females obtained is consistent with the findings in Port Harcourt (8) and in Benin (6), both in Nigeria. This may have to do with the domestic chores the girl-child performs. The significant influence of class and not age of pupils on prevalence seems to implicate the pupil's knowledge and personal hygiene. Similarly, the influence of schools' ownership on prevalence could be attributed to better hygiene and care. Most pupils claimed to always wash their hands before eating yet infection was significantly higher in these. Coupled with the insignificant effects of hands-washing after toilet use, hands hygiene may not be the main infection route amongst these pupils. The insignificant effects of patronizing food vendors and water treatment seem to support this. Other risk factors and habits should be

assessed, especially the means of environment contamination with faecal matter and how pupils become exposed. The risk of infection was higher for pupils living in faecally contaminated areas and a sizable student proportion used toilet facilities with high potentials for environmental contamination. Such studies may explain why hawkers were identified as a high risk group.

Control of the burden of intestinal helminths should involve the government, parents and the pupils. Human and animal waste products should be hygienically disposed of and efforts made to reduce and possibly eliminate their contamination of our environment. Regular mass deworming could be incorporated in educational policies. Reinvigorated enlightenment campaigns on intestinal helminths targeting care groups should be embarked upon. Children should be taught personal hygiene at home and in schools. Enlightenment of the parents and pupils on worms' control and chemotherapy should increase the number of pupils taking antihelminthics as routine medication. The prevalence amongst antihelminthic users indicates either high incidence and/or impaired drug efficacy. If effective broad-spectrum antihelminthics are used, then the prescribed frequency of routine medication could be increased as irregular deworming may be responsible. The facts that 11.0% of antihelminthics users took drugs within study year, 50.8% the previous year; while the rest took drugs 2-10 years ago suggest this.

In spite of the current socio-economic conditions in Nigeria, efforts should be made to dissuade child-hawkers both for the child's health and education. Hawkers could be targeted for mass deworming.

Acknowledgements

We appreciate all the schools and students who were part of this study. We are grateful to the Medical and Paramedical Corps members of LMLGA who helped administer the questionnaires. We thank God for making this work a reality.

REFERENCES

1 Ezigbo JC, Okafor FC, Igbinosa IB and Amazigo UO. *Parasitology for medical students* (1st edn). New Frontiers Publishers, Lagos, Nigeria. 1990; pp 19-35.

2 Davis A. *Drug treatment in intestinal helminthiases*. World Health Organization, Geneva. 1973; pp 5-50.

3 Janssen-Cilag and Chi Pharmaceuticals Ltd. *The symptoms and treatment of worms*. Unpublished data.

4 Olsen A, Samuelsen H and Onyango-Ouma W. A study of risk factors for intestinal helminth infections using epidemiological and anthropological approaches. *Biosoc Sci.* 2001; **33**(4): 569-84.

5 Naish S, McCarthy J and Williams GM. Prevalence, intensity and risk factors for soil-transmitted helminth infection in a South Indian fishing village. *Acta Trop.* 2004; **91**(2): 177-87.

6 Wagbatsoma VA and Aisien MS. Helminthiasis in selected children seen at the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. *Niger Postgrad Med J.* 2005; **12**(1): 23-7.

7 Cheesbrough M. Parasitological tests: In *District Laboratory practice in tropical*

countries – Part 1, Cambridge University Press, Cambridge. 1998; pp. 178-235.

8 Wariso BA and Ibe SN. Prevalence of some intestinal helminths in Port Harcourt University of Port Harcourt Teaching Hospital, Nigeria. *West Afr J Med.* 1994; **13**(4): 218-22.