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ASCARIASIS AND ITS IMPACT IN RURAL COMMUNITIES NEAR ABEOKUTA, NIGERIA

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ABSTRACT

An evaluation of ascariasis was investigated in six rural communities (Idi-Ori, Dega –Eruku, Tolato, Ika-Ajibefun, Aka/Kipe and Akiode) near Abeokuta, Nigeria. Faecal examination, structured questionnaires and physical observations were used to determine prevalence, burden of disease, Knowledge, Attitude and Practices (KAP) of the 619 respondents in the study areas. Males 334 (54%) were more than females 285 (46%) across the communities. Age groups observed were 31 years and above (34.5%), 1-10 years (27.5%), 21-30 years (25.1%) and 11-20 years (12.9%). The study revealed a very high prevalence of infection (96-100%) in all the communities, but with low intensities. Both prevalence and intensity were not significantly affected by the differences in age groups and sex ($p>0.05$). Sanitary behaviour showed that respondents preferred the bush as sites for defaecation (91.8%) and disposal of house-generated wastes (92.2%) respectively. Sources of drinking water are mainly stream/pond (65.6%), borehole (28.1%) and deep well (6.3%). Mean analysis of the effect of infection burden (64.72 ± 15.28) showed that ascariasis had very serious effect on their daily activities. Inability to go to farm (54.90 ± 10.96), was identified as the highest burden, followed by inability to go to market (25.30 ± 5.44) and inability to go to school (19.81 ± 10.38). T-test analysis revealed a significant difference between infection status and socio-economic activities (inability to farm t = 12.260, P = <0.005, inability to go to school t = 4.670, P = <0.005 and inability to go to market t = 11.382, P= <0.005). Most respondents revealed that infection status exceeded five months. The level of assistance received during infection, only showed a correlation relationship of r ' 0.838, at p ' <0.005 between the infected individual and his/her spouse. Forty percent of the respondents utilised orthodox treatment, as opposed to 29.7% that utilized herbal treatments. 45.3% of the respondents can only afford the sum of N50.00 for treatment, 9.6% can afford N51 – N100, while 36.6% of respondents are not willing to pay. The lack of unwillingness to pay for treatment may also be attributed to the ignorant nature of the effects of ascariasis, and the economic profile of the respondents, who are mainly farmers.

Keywords: Ascariasis, prevalence, evaluation, rural communities, Abeokuta.

INTRODUCTION

Gastrointestinal helminthiasis, including ascariasis, a major disease condition constitutes major health problem in Nigeria. Helminths rank among the most prevalent of human infections responsible for disability, morbidity and mortality (Baird *et al.*, 1986; Bolbol, 1992; Mafiana *et al.*, 1998; Habbari *et al.*, 1999; David, 2002; WHO, 2004; Ugbomoiko et al., 2006) particularly in populations where ignorance, poor water supply and unhygienic practices

contribute to spread of helminth infection.

Crompton (1999) had estimated that 1,472 million persons harbour *A. lumbricoides*, 1,298 million are infected with Hookworm, and about 1,049 million have *Trichuris trichiura* globally. Such estimates of disease burden, even though impossible with complete accuracy, are extremely important because they can be useful for decision making and intervention programmes (Stephenson *et al.*, 2000).

Disease burden which is an important measure of the degree of morbidity and mortality in a given population measures the dimension of the health problem and the component of years lived with morbidity and mortality in a given population by using a summary measure to provide a quantitative measurement of health status (Abouzahr and Vaughan, 2000). However, in sub-Sahara Africa, information on the extent of disease burden of rural dwellers due to Ascariasis are scanty, this Mafe *et al.* (2000) opined could mainly be that health related researches are focused in areas where there are existing government interests, most of which are either infants or mothers' related diseases.

The usefulness of questionnaires and parasitological parameters for making inquires into health problems of people is well recognised, and has proved useful in studies of self-reported morbidity by school children in Ghana, Mozambique and Tanzania (Moestue *et al*., 2003) and Cote d'Ivoire (Raso *et al.*, 2005).

The present study uses questionnaire data in addition to some parasitological parameters to evaluate the prevalence and burden of ascariasis infection in rural communities with a view to providing information for intestinal parasite control programme

MATERIALS AND METHODS

Study Area

The study was carried out in six rural communities within Abeokuta geographic areas namely: Idi-Ori, Dega –Eruku, Tolato, Ika -Ajibefun, Aka/Kipe and Akiode which lie around latitude $7^{o}6$'N and $3^{o}16$E in the rainforest belt of Nigeria. Members of the communities, which are of the Yoruba tribe, are mainly farmers and traders.

Earth roads interlink the communities. They lack basic amenities such as electricity supply, pipe borne water (except Idi-ori), and adequate facilities for refuse and sewage disposal. A Primary Health Centre (PHC) exists at Idi-ori, which also serves neighbouring communities.

The objectives of the study were explained to the Health officer in charge of the Primary Health Centre and the village chiefs, who in turn gave their assent for the study to commence. Informed consent was obtained from participants before questionnaire administration. An enumeration was made of all persons 1 year and above in each community, using the already existing Primary Health Care (PHC) numbers on each house. For each household, name, age, sex and marital status of each person were recorded. In all, the total population of each village was as follows: Idi-Ori – 283 (having 39 clustered houses), Dega – Eruku- 215 (30 houses), Akiode – 132 (21 houses), Ike Ajibefun – 121 (23 houses), Tolato 109 (17 houses), and Aka/kipe 87

(14 houses).

A total of 619 (65%) persons that gave their out of the total population of 947 persons participated in the study. Stool samples were collected from 619 persons (Idi-Ori (160), Dega-Eruku (139), Akiode (90), Ika-Ajibefun (90), Talato (70), and Aka/Kipe (70) and examined under the microscope for *Ascaris* ova, using the quantitative Kato thick smear (Martin and Beaver, 1968). The egg per gram (epg) of faeces was then calculated after adjusting for age and consistency (Nawalinski *et al.*, 1978).

Knowledge on health education and disease burden

Structured questionnaires were administered to all 619 respondents, in addition to focus group discussions, and direct observations. The study was conducted between he hours of 6.30 am to 8am and 5.30pm to 7pm since most of the population are farmers and traders. All participants were encouraged to express their feelings, ideas, perceptions and opinions freely (Parents assisted in responding to questions for children between ages 1 to 9 years). Other information requested were causes of worm infection in addition to treatment methods. Personal observations on the availability of toilet facilities and the level of sanitation and sanitation related practices were noted in all the communities visited.

Data Analysis

EPI Info version 2000 employing simple percentiles were used in analyzing the questionnaires. SPSS software version 10 was used to determine the prevalence and intensity by age-group and sex. Students t-test and Correlation analysis were employed in establishing the relationships between burden of infection and socioeconomic activities.

RESULTS

Prevalence ranged from 96 to 100% while mean intensity (epg), though low, varied from village to village (Table 1). No significant prevalence statistical differences were observed between the age-groups and sexes in all the villages ($p > 0.05$) as shown in Table 2. Also, when the age groups were stratified by sex, no significant difference was observed ($P>0.05$).

Table 1: Prevalence and mean intensities of *Ascaris lumbricoides* in the communities near Abeokuta, Nigeria

Village	No. examined	% infection	Mean Intensity (epg)
Idi-Ori	160	100	2878.04 ± 720.8
Dega-Eruka	139	97	2251.43± 830.74
Akiode	90	96	978.43 ± 879.24
Ike-Ajibefun	90	100	3611.36 ± 224.58
Tolato	70	98	1027.36 ± 714.45
Aka/Kipe	70	96	2617.16 ± 454.08

Table 2: Age-sex related intensity (± SEM) of *Ascaris lumbricoides* infection near Abeokuta, Nigeria

	Idi-Ori	Dega Eruku	Akiode	Ika-Ajibefun	Tolato	Aka/Kipe
Age class (years)						
1-10	2860.76± 371.1	1421.73±880.17	1292.60±791.64	1824.00±1821.10	2804.00± 151.4	826.00± 421.10
11-20	2815.94 ± 462.8	2536.95±546.67	415±119.41	4617.37±1149.10	536.95±146.67	216.95± 177.6
21-30	4126.00±1484.3	3874.42±923.18	320.25±1187.31	1388.33±1532.10	864.42± 323.10	774.42± 223.99
31-above	2343.50±612.0	2359.00±945.98	378.00±1370.99	4634.00±1625.10	978.00± 308.69	178.50± 70.93
Sex						
Male	2795.44± 446.4	1846.08±395.72	667.61±560.20	3787.78±807.50	2687.78± 43.57	2197.78± 227.5
Female	2852.17± 475.7	2656.78±450.09	1289.25±880.87	3434.96±1013.40	1967.25± 143.8	1755.22± 210.7

Demographic status and Sanitation conditions

Analysis of questionnaires received (Table 3), indicated the ratio of male (334) and female (285) respondents in the study population, their age groups, marital status and educational status/level of the respondents. The results showed that majority (92.2%) of the respondents across the communities' dispose of their house-generated wastes in the bush while 7. 8% of the respondents use refuse sites. Also, 91. 8% of the population claimed that they do not have toilet facilities and so defaecate in open field or bush, while 6.0 and 2.2% utilize the refuse site and pit latrine, respectively. Majority of the respondents across the communities make use of stream water (65. 6%), borehole (28. 1%) and 6. 3% of respondents use the deep well, respectively.

Table 3: Demographic information about the respondents from the rural communities near Abeokuta, Nigeria

Parameter	% (Respondents)
Sex	
Male	54
Female	46
Age groups	
1 – 10 years	27.5
11 – 20 years	12.9
21 – 30 years	25.1
> 31 years	34.5
Marital Status	
Married	44
Widow	9.7
Separated	15.1
Single	30.7
Educational Status/Level	
No formal education	38.2
Primary School	41.4
Secondary School	20.4

Burden of Infection

The symptoms of infection as explained by the respondents across the communities were expulsion of worms in faeces, stooling and vomiting (81.5%), followed by malaria and cough (10.7%). Others are stunted growth and reduction in food intake (4.1%), while body weakness (3.8%) had the least symptoms.

The knowledge of the burden of infection due to *A. lumbricoides* was assessed among the respondents in the different study areas. Figure 1 indicates that majority of the respondents (over 60%, mean response = 64.72 ± 15.28) considered the infection with *A. lumbricoides* a very serious effect on their daily activities, when compared with negative responses mean of 35.28 ± 15.28.

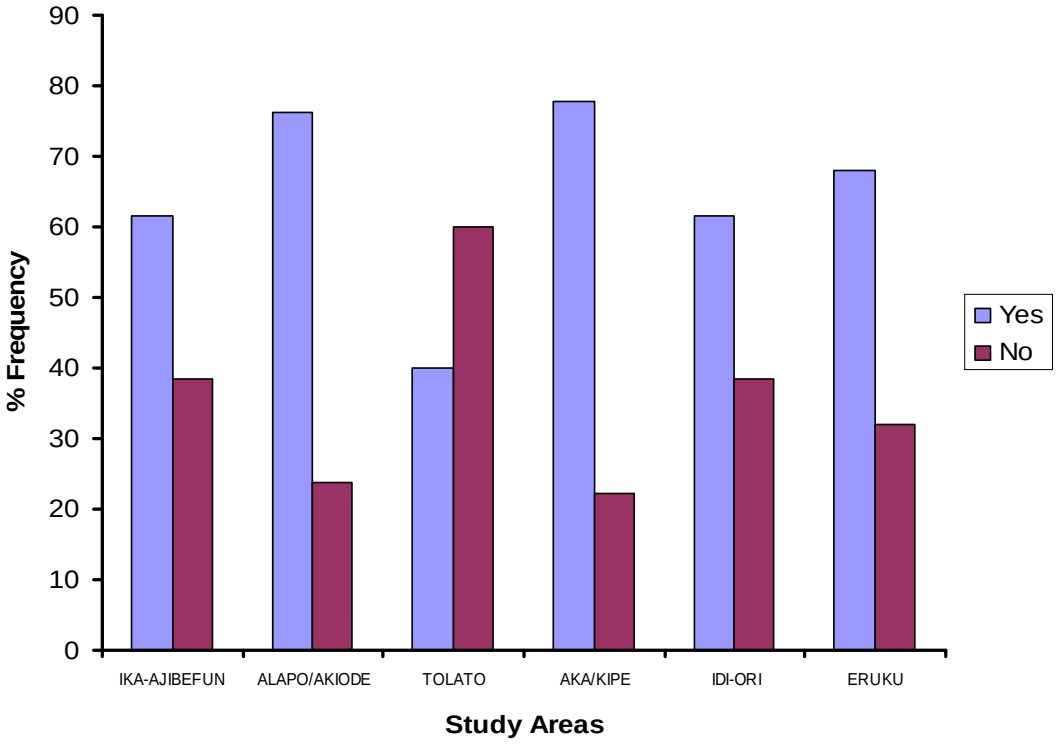

Figure 1: Perception of the respondents on effects the infection due to *A. lumbricoides* has on daily activities.

In assessing socioeconomic activities and the burden of infection, Fig. 2 illustrates that 55% of the respondents admitted that infection due to ascariasis affected farming activities, followed by their inability to attend market (25%) and school (20%). T-test analysis revealed a significant difference between burden of infection and their socio-economic activities (i.e., unable to farm ($t = 12.260$, $p =<0.005$), unable to go to school ($t = 4.670$, $p =<0.005$), and unable to go to market ($t = 11.382$, $p = <0.005$) accordingly.

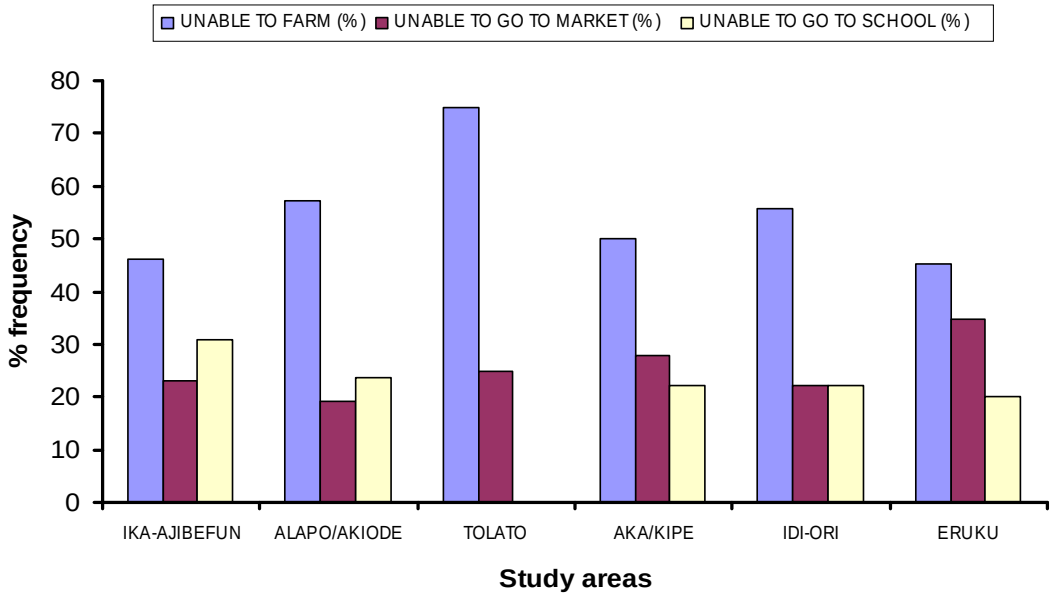

Figure 2: Perception of the respondents on the burden of infection on socio-economic activities.

On the duration of infection, most of the respondents in the communities i.e. Aka/ Kipe 77.8%, Eruku 77.3%, Alapo/Akiode 52.4%, Idi-ori 51.2%, Tolato 50% and Ika -Ajibefun 46.2%; are of the opinion that infection due to *A. lumbricoides* exceeded 5 months in their body system. Student T-test analysis on the effect of the duration in the different community members revealed only significant relationship in Aka/Kipe ($t = 4.330$, $p<0.002$) and Idi-ori ($t = 3.794$, $p<0.004$) villages.

The levels of assistance offered during the period of infection are presented in Table 4. Statistical mean analysis revealed that most sick persons relied more on hired labour (17.23 ± 11.57), followed by children (15.10 ± 10.19), parents (14.76 ± 9.08), friends (12.75 ± 13.35) respectively. T-test analysis on the level of assistance received revealed no significant relationship among them. This implies that the levels of assistance do not depend on the type of individual, but the person that is readily available to offer the assistance.

In assessing respondents' attitude during the duration of infection, Table 4 shows that individuals who offered assistance to sick persons complained about the time they spent rather than endured or showed pity, respectively.

Table 4: Effect of infection burden due to Ascariasis on the respondents

Parameter	% (Respondents)
Duration of Infection	14.7
1 -2 days	10.3
3 – 6 days	2.7
1 – 2 weeks	3.3
3 – 4 weeks	6.3
1 – 2 months	3.6
3 – 5 months	59.2
> 5 months	
Assistance received	
Self	14.9
Hired labour	17.2
Children	15.08
Husband	1.3
Husband & Children	6.35
Wife & Children	8.98
Parents	14.8
Friends	12.8
Relatives	8.7
Attitudinal responses	
Complained	68.5
Endured	24.5
Showed pity	7.0

The study also showed that 54.68% of the respondents in the different communities visited the health centre as against 45.32% that did not use the health centres during the period of infection. The communal attitudes (Table 5) showed that 40% of the respondents across the communities used orthodox drugs for treatment, 29.7% use herbal treatment, while 8.7% of the respondents believed solely in prayers for spiritual treatment and healing, and 21.5% ignored the treatment of the disease condition.

In assessing the financial burden with respect to spending capacity of the infected persons to pay for drugs in the treatment of the disease, 45.3% of the respondents are willing to pay between N1 - N50, when compared with 36.6% of the respondents that are not willing to pay for treatment and preferred to ignore treatment (Table 5). The lack of unwillingness to pay for treatment may also be connected with economic power of the respondents who are mainly subsistence farmers. On the effectiveness of the use of drugs, 60.4% of respondents admitted that treatment with orthodox drugs was effective within 1–5 days.

Table 5: Communal attitudes on treatment measures against gastrointestinal parasites.

Parameter	% (Respondents)
Treatment method	
Use of Orthodox drugs	40
Herbal therapy	29.7
Prayers	8.7
Ignored the disease	21.5
Cost of Treatment (N)	
1 – 50	45.3
51 – 100	9.6
101 – 200	6.1
201 -300	0.6
> 300	1.8
Do not want to pay	36.6
Effective duration of treatment	
Days	60.4
Weeks	19.2
Months	7.6
Ineffective	12.8

DISCUSSION AND CONCLUSION

The study observed that in spite of the varying high prevalence of ascariasis in the communities, intensity was low across all age groups and sexes. This is similar to earlier reports by Sam-Wobo *et al*. (2008) who observed varying prevalence of ascariasis from location to location and attributed that it could be due to the foci of study. Neither age nor sex was found to be an important factor with regard to both prevalence and intensity of infection, indicating a common pattern of behaviour and susceptibility in all the communities. This is however in contrast with studies of Asaolu *et al.* (1992) in some rural communities elsewhere in Southern Nigeria where both prevalence and intensity peaked in the 5-14year old, while it declined in the older age classes.

The results showed that more persons above 31 years were observed from the study, which is also related to the number of married respondents, and the need for more helping hands in agriculture, in order to reduce the cost of labour. The literacy level of the respondents was low. Majority of persons either had no formal education or attended only primary school. The study observed that some parents considered one or two year's education enough for literacy for their children in primary school, thereby withdrawing them from school for labour, especially in low-income families; as also reported by Ulukanligil and Seyrek (2003).

Hygiene and sanitary evaluation of the respondents revealed the high use of bush as site of waste disposal (92.2%) and defecation (92.9%). The unhygienic practices of the respondents contribute to the spread of

helminth infections. Despite the availability of borehole (hand pump) in Idi- ori community, majority of the respondents across the communities (Idi-ori inclusive) still prefer getting their drinking water from the stream. The stream, they claimed, is a gift to the communities from God and the water from this stream heals any kind of diseases. Secondly, they complained that the borehole (hand pump) is stressful and time consuming.

The high percentage of infection with *A. lumbricoides* across the communities confirms earlier reports by Mafiana *et al.* (1998). This is as a result of the fact that ignorance; poor water and unhygienic practices contribute to the spread of the infection pattern of *A.lumbricoides* (Bolbol, 1992; David, 2002). The study confirms reports by Sam-Wobo *et al.* (2005), that most respondents are ignorant of the fact that *A. lumbricoides* are acquired by the ingestion of viable eggs. Most respondents claimed that the presence of *A. lumbricoides* in their body is not an infection but a natural occurrence in the body.

Smyth (1994) had reported that the adult worms in the intestine evoked generalized digestive disorders such as abdominal discomfort, nausea. However, the symptoms of infection mostly identified by infected respondents are pains and vomiting. The burden of the disease due to ascariasis had been reported in developing countries to be responsible for poor growth, reduced physical activity and impaired learning ability (Stoltzfus *et al.,* 1996). Result from this study reveals that majority of the respondents (over 60%) considered the infection with *A.lumbricoides* a very serious burden (i.e. unable to go to farm, unable to go to school, and unable to go to market).

Assessment of assistance received during period of infection showed that assistance depends on the willingness and readiness of the individual to offer assistance. Schopper *et al.*(2002) reported that communicable disease accounted for 79% of the disability adjusted life years. The study also observed that those infected and those that offered assistance complained about waste of time, leading to loss of productive years.

Andrade *et al*. (2001) reported that broad spectrum anti-helminthic drug is an effective means of reducing worm burden and its related morbidity. Some of the respondents stated that drugs such as Levamisole given to them during infection have been effective in the treatment of the *A. lumbricoides* infection. The beliefs that there was no drug for treatment of *A. lumbricoides* by some respondents might be due to incomplete usage of drugs, as well as lack of willingness to pay for treatment, which also brings to fore the serious problem of ignorance, attitude and beliefs by rural communities.

Finally, the study showed that ascariasis infection is a serious burden on the health status of both the infected persons and those offering assistance among rural communities of Abeokuta of Ogun State. Adequate health education should be promoted so as to reduce the disease burden, encourage good sanitary environment and mass chemotherapy coupled with other basic amenities to provide some level of good living in the rural communities.

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