

PREVALENCE OF PARASITIC DISEASES AMONG NOMADIC FULANIS OF SOUTH-EASTERN NIGERIA

Jude C. Anosike¹, Bertram E. B. Nwoke¹, Celestine O. E. Onwuliri³, Charles E. Obiukwu², Akuchinyere F. Duru², Micheal I. Nwachukwu², Chinyere N. Ukaga¹, Joseph C. Uwaezuoke², Olga S. Uduji², Oliver U. Amajuoyi¹, Benjamin I. Nkem²

¹Nomadic Research Programme Department of Animal and Environmental Biology, Imo State University, Owerri, Nigeria

²Department of Microbiology/Industrial Microbiology Imo State University, Owerri, Nigeria

³Department of Zoology, University of Jos, Nigeria

Anosike JC, Nwoke BEB, Onwuliri COE, Obiukwu CE, Duru AF, Nwachukwu MI, Ukaga CN, Uwaezuoke JC, Uduji OS, Amajuoyi OU, Nkem BI: Prevalence of parasitic diseases among nomadic Fulanis of south-eastern Nigeria. *Ann Agric Environ Med* 2004, **11**, 221–225.

Abstract: A study was carried out to determine the prevalence of parasitic infections among the nomadic Fulanis of south-eastern Nigeria between September 2003–March 2004. Urine, stool and blood specimens were collected from each of 231 subjects. Of these, 98 (42.4%) were infected with one or more of 14 parasitic species, of which *Plasmodium malariae* had the highest prevalence (15.3%). Others included 6 intestinal helminth parasites: *Ascaris lumbricoides*, hookworm, *Strongyloides stercoralis*, *Schistosoma mansoni*, *Enterobius vermicularis*, *Trichocephalus trichiurus*, 2 protozoan parasites: *Entamoeba histolytica* and *E. coli*, 4 blood parasites: *Mansonella perstans*, *Loa loa*, *Trypanosoma* sp, *Plasmodium falciparum*, as well as *Schistosoma haematobium* recovered in the urine. Prevalence of these parasitic infections varied significantly among bush encampments, sexes, and age groups. They had evidence of onchocerciasis. Their occupational imperatives, beliefs and general life style are contributing factors to the prevalence of parasitic infections among the nomadic Fulanis of south eastern Nigeria. Aspects of prevalence and control of parasitic infections are discussed.

Address for correspondence: Dr. J.C. Anosike, Department of Animal and Environmental Biology, Imo State University, Owerri, P.M.B. 2000 Owerri, Nigeria.
E-mail: jc_anosike@yahoo.com

Key words: parasites, prevalence, Nomad, Fulanis, diseases, control, Nigeria.

INTRODUCTION

Parasitic infections of man are diseases caused by parasites. These include onchocerciasis, lymphatic filariasis, amebiasis, trypanosomiasis, schistosomiasis, taeniasis, dracunculiasis, malaria, as well geohelminth diseases, among others. They are currently responsible for various types of disease conditions of man worldwide. Information on the various ethnic groups in Nigeria in relation to parasitic infections associated with them are fragmentary. Wijeyaratne *et al.* [24] documented evidence

of human filariasis amongst the Fulanis, Hausas and Maguzawa of Kaduna State. Arene and Atu [8] reported on the *Mansonella perstans* microfilaramea among the Bori people of the Niger Delta of Nigeria. Ogbonna *et al.* [18] worked on the dermatophytic infections amongst nomadic Fulani herdsmen of Plateau State, central Nigeria. They found that ringworm infection is a major public health problem of the nomads in that area. In Taraba State, northern Nigeria, Akogun [2] recorded a 39.6% of onchocerciasis among the Hausas/Fulani ethnic-group. Furthermore, Anosike *et al.* [7] gave a detailed

report on mansonelliasis among the Ibos of Imo and Abia States of Nigeria. Even in Kenya, the disease pattern of the nomadic people in Samburu district has been summarized [11]. It was observed that fever was the most severe, followed by respiratory and alimentary diseases. In continuation of our effort in elucidating most of the medical problems of various ethnic groups in Nigeria, the present study became necessary. Earlier, most studies on various ethnic groups in Nigeria had centred on filariasis and mainly from the northern region [12]. This being so, aspects of parasitic infections on the nomadic Fulanis of south eastern Nigeria is yet to be investigated. The present work is a preliminary investigation on the prevalence of parasitic infections amongst the Nomadic Fulanis of South-Eastern Nigeria.

MATERIALS AND METHODS

Study area and Population. The area covered during this study is part of south-eastern Nigeria. These are mainly the Ibo-speaking parts of Imo, Abia, Enugu and Ebonyi States. In these areas are found the nomadic Fulanis who rear some domestic animals such as cattle, goats, sheep, camels, among others. They live in various bush encampments from where they herd their animals in search of green pasture. They live in houses made of leaves, without proper doors. Nomads inhabiting these huts are easily susceptible to vector bites, such as mosquitoes, black flies, biting midges (*Culicoides*), tsetse flies (*Glossina* spp.) as well as deer flies (*Chrysops* spp.) [6]. Only Nomads inhabiting 4 bush encampments located in Imo, Abia, Enugu and Ebonyi States were examined for parasitic infections between September 2003–March 2004. The nomadic Fulanis are not indigenous to the area but are superb herdsman. They move from one part of the country to another, mainly from northern to southern parts. Their origin is unknown, although some claim to have originated from Chad Republic, Cameroon, or Benin Republic. They move from the northern part of Nigeria during the end of the dry season to the south-eastern part, mainly for green pasture for their animals. During this period, they live in several bush encampments from where they venture out. As the grazing disappears in one area or the water holes dries up, the nomadic Fulanis move. They live with their families and animals and speak mainly the Fulani language and Hausa. A very few could understand pigeon English. Their children hardly go to school as they follow their fathers in herding. Their women go out to the nearby towns to sale “fura” and “nono”. The main diet of the nomads is milk, meat and cereals, but we noticed that they also ate berries and leaves as they walked around.

Pre-survey contact and mobilization. A preliminary survey was carried out in the early part of September 2003 in the 4 bush encampments chosen for the study. Considering the strict socio-cultural and religious observances peculiar to the nomads, a pre-survey protocol

preceded actual data collection. This was necessary to be sure of maximum co-operation from the nomads and was successfully carried out through the encampment heads. The people in each bush encampment were fully mobilized before sample collection.

Specimen collection. Both thick and thin blood smears were made from finger pricks onto the same slide. Midstream urine specimens were collected from nomads aged over one year into 15 ml glass bottles. All blood and urine samples were collected between 10.00 am–12.00 noon on each occasion. Only day time blood specimens were collected. The age and sex of each nomad was noted. The samples were brought back to the laboratory within 3 hours of collection, and the slides dried and stained with Giemsa and examined for common blood parasites. The urine samples were centrifuged and the sediments poured into labelled universal bottles containing 5 ml of a 1.0% aqueous solution of carbol fuchsin. Specimens were stained in carbol fuchsin for 15minutes and examined for common urinary parasites. Because the staining solution contains an alcohol fixative and a phenol preservative, sub-samples could be stored for examination later. For stool specimen collection, each nomadic Fulani was given a numbered specimen bottle and a sheet of newspaper. The procedure for introducing stool into the bottle was thoroughly explained. The formol - ether concentration method [15] was closely followed for laboratory examination of stool specimens.

Data Analysis. All the data on urine, stool and blood specimens were stratified according to age, sex and various bush encampments. Data was analysed using standard statistical tests, including χ^2 and students *t*-test. Values were considered statistically significant at $p < 0.05$.

RESULTS

A total of 14 parasitic infections were encountered. These parasites include 6 intestinal helminths namely: *Ascaris lumbricoides*, hookworm, *Strongyloides stercoralis*, *Schistosoma mansoni*, *Enterobius vermicularis*, *Trichocephalus trichiurus*, 2 protozoans: *Entamoeba histolytica* and *E. coli*: 5 blood parasites: *Mansonella perstans*, *Loa loa*, *Trypanosoma* sp., *Plasmodium malariae*, *P. falciparum*, as well as *Schistosoma haematobium* recovered in the urine. The occurrence of these parasites varied significantly ($p < 0.05$). *P. malariae* had the highest occurrence (15.3%), followed by *S. mansoni* (11.2%), *L. loa* (10.2%), hookworm (9.2%) with *E. coli* as the least (Tab. 1). Of the 231 nomads examined, 98 (42.4%) were infected with 1 type of parasitic infection or the other. Of the 4 different nomadic bush encampments sampled in south-eastern Nigeria, infection was significantly higher in Ebonyi state than in the others ($\chi^2_{12df} = 1048.2$, $p < 0.05$). A prevalence of 33.3%, 37.5% and 33.3% were recorded for Imo, Abia and Enugu states encampments respectively (Tab. 2). More Fulanis were examined in

Table 1. Types and occurrence of parasitic infections amongst nomadic Fulanis in south-east Nigeria.

Parasites	No. of infected subjects	Percent of occurrence (n = 98)
<i>Ascaris lumbricoides</i>	6	6.2
Hookworm	9	9.2
<i>Strongyloides stercoralis</i>	4	4.2
<i>Schistosoma mansoni</i>	11	11.2
<i>Enterobius vermicularis</i>	3	3.2
<i>Trichocephalus trichiurus</i>	7	7.1
<i>Entamoeba histolytica</i>	5	5.1
<i>Entamoeba coli</i>	2	2.0
<i>Schistosoma haematobium</i>	8	8.2
<i>Mansonella perstans</i>	7	7.1
<i>Loa loa</i>	10	10.2
<i>Trypanosoma brucei rhodesiense</i>	3	3.2
<i>Plasmodium malariae</i>	15	15.3
<i>Plasmodium falciparum</i>	8	8.2

Table 2. Distribution and prevalence of parasitic infections among nomadic Fulanis in the study area.

Bush encampments	No. of examined subjects	No. of infected subjects	Percent of prevalence
Imo State	60	20	33.3
Abia State	40	15	37.5
Enugu State	45	15	33.3
Ebonyi State	86	48	55.8
Total	231	98	42.4

Table 3. Sex-related prevalence of parasitic infections among nomadic Fulanis in some bush encampments in south-eastern Nigeria.

State	Men			Women			Total		
	N	n	%	N	n	%	N	n	%
Imo	40	16	40.0	20	4	20.0	60	20	33.0
Abia	32	13	40.6	8	2	25.0	40	15	37.5
Enugu	34	12	35.3	11	3	27.3	45	15	33.0
Ebonyi	61	38	60.3	25	10	40.0	86	48	55.8
Total	167	79	47.3	64	19	29.7	231	98	42.4

N = No. of examined subjects, n = No. of infected subjects.

Table 4. Age specific prevalence of parasitic infections amongst nomadic Fulanis in the study area.

Age group	No. of examined subjects	No. of infected subjects	Percent of prevalence
1–5	0	0	0
6–10	10	2	20.0
11–15	16	6	37.5
16–20	20	7	35.0
21–25	27	13	48.1
26–30	45	20	44.4
31–35	36	20	55.6
36–40	20	12	60.0
41+	57	18	31.6
Total	231	98	42.4

Ebonyi state bush encampment than in others. Of the 231 nomads examined, 167 and 64 were males and females respectively. More males - 79 (47.3%) than females - 19 (29.7%) were infected. A chi-square analysis showed that parasitic infections were significantly higher in males than females ($\chi^2_{12df} = 144$; $p < 0.05$). Table 3 is a detailed summary of sex-related prevalence of nomadic Fulanis in south eastern Nigeria. Table 4 depicts the age specific prevalence of parasitic infections amongst Fulani nomads in the study area. There was a gradual increase in the prevalence with increase in age. Age group 36–40 years had the highest prevalence of 60.0%, followed by the 31–35 (55.6%) and 21–25 years age group (48.1%). About 66.3% of all the infected nomads belong to the age group 21–40 years. This was also statistically significant ($p < 0.05$). Prevalence of *S. mansoni*, *M. perstans*, *L. loa*, *P. malariae* and *P. falciparum* being higher than others. Moreover, 60 adult Fulani nomads (30 males and 30 females) over 50 years of age were interviewed on the existence/occurrence of other parasitic infections among the people. About 40% of them agreed that they had suffered from such diseases, e.g. lymphatic filariasis. About 55% of those interviewed agreed that they have malaria, intestinal helminths, protozoan infection and diarrhoea diseases. They also showed evidence of some local remedies for these parasitic diseases. Such remedies were obtained from roots and leaves/bark of some medicinal plants. Of the 30 adult male Fulanis examined physically for clinical manifestations of filarial infections, 33.3% had onchocercal nodules on their bodies. Five (16.7%) had evidence of leopard skin, while 3 (10.0%) had an elephantoid scrotum. There is evidence of *Onchoaciasis* amongst the population.

DISCUSSION

The present study shows that 14 different parasitic infections were recorded among the nomadic Fulanis of south-eastern Nigeria. These include, ascariasis, trichuriasis, hookworm infections, strongyloidiasis, schistosomiasis, loiasis, and trypanosomiasis, as well as malaria. All these parasitic infections have been reported in various parts of Nigeria [3, 6, 7, 16, 17, 19, 21]. The presence of 14 parasitic infections among the nomadic Fulanis of south-eastern Nigeria supports the earlier observations that parasitic infections constitute a major public health problem in the country [1, 9, 22]. This observation is in accordance with the report by Gundiri *et al.* [12] who recovered 8 parasite species among school age Fulani children in Guduso, Girei Local Government Area of Adamawa State in northern Nigeria. The existence of some parasitic infections, such as malaria, mansonelliasis, loiasis and trypanosomiasis among the nomads is probably related to the peculiar ecological nature of the area which favours the breeding of their respective arthropod vectors. Therefore, this might well indicate the presence of the disease vectors in the area, or the Fulanis might have acquired the infections in other areas during

herding and seasonal movement. Again, the nomadic Fulanis usually dress in their normal attire - exposing most parts of their body. This behavioural pattern predisposes them easily to insect bite. In contrast, the recovery of some of the intestinal parasites in this study indicates the level of hygienic practices exhibited by the nomads since these do not require an intermediate host, except for *S. mansoni*. The level of personal hygiene and environmental sanitary conditions in the bush encampments are low. Rather, indiscriminate defecation by nomads and their animals is a common practice. Also, the recovery of *S. haematobium* in the study could have been acquired in the waterlogged areas or infested ponds during herding [7]. It is interesting to note that several factors are responsible for the various prevalence rates of parasitic infections observed herein. The high prevalence of schistosomiasis in the area could be due to the inability of the nomads to wear rubberboots while herding along the river valleys where water contact could easily be made with infested intermediate host. Also, drinking pond water/unsafe water could lead to infection by intestinal parasites. Their occupational imperatives (dispositions) is a major factor. Exposure to bites of culicoides, mosquitoes, glossina and chrysops while herding could explain the presence of parasitic infections such as mansonellosis, and trypanosomiasis, as well as loiasis. Generally, 42.4% prevalence of parasitic infection was observed in the present study. This is relatively higher than those of either Gundiri *et al.* [12] in Adamawa State in northern Nigeria (33.3%) or Anosike *et al.* [7] in Central Nigeria (8.2%). Such variation could be related to the local environmental factors of the different areas or the behavioural practices of the nomads concerned [11]. Malaria infection due to *P. falciparum* and *P. malariae* exists amongst the nomads, although it is not as high as those reported in parts of Lagos [10, 20]. This suggests the existence of the disease, similar to the reports of Haraldson [14] that malaria is a serious health problem among nomads in Ethiopia as well as in Kenya where malaria fever is known to be the most severe health problem amongst the Samburu nomadic people [11]. This indicates an abundance of mosquito vectors with a high contact rate by the nomadic population. There was also variation in prevalence of parasitic infections in different bush encampments. This was also significant. Perhaps this could be related to the environmental factors such as topography of the encampments in relation to the breeding sites of the disease vectors. It could as well be the pattern of the hygienic practices exhibited by the particular group of nomads in question. Moreover, such variation may well be related to the infection acquired en-route while herding from one place to another since they have no permanent abode and the origin of the nomads differs [6]. Sex-related prevalence of parasitic infections was also observed. Males had more infections than females, similar to the observations of in other endemic foci in Africa [6, 11, 7]. This again is related to exposure of the males to disease vectors while herding. The females

are mainly involved with household chores and the selling of "fura" and "nono" in nearby towns. The pattern of age differences in infection with schistosomiasis appears similar to that of malaria. High infection rates are found in Fulani children between 5-13 years old. This finding is similar to the observations of Anosike *et al.* [7] in Bauchi, and Gundiri *et al.* [12] in Adamawa state in northern Nigeria. The age-related change in the prevalence of infection has been recognized as characteristic of *S. haematobium* [25]. Factors which have been proposed to account for this include a decrease in infested water contact with age and immunity in older subjects [23]. In the Fulani bush encampments, contact with infested water among the school age children, who often do their laundry and also bathe in the numerous pools of water, was common. This observation is contrary to the reports that *Schistosoma* and hookworm do not thrive among nomads [14]. Filariasis has a moderately low prevalence rate with 10.2% and 7.1% of the population showing *L. loa* and *M. perstans* infections respectively. This corroborates the earlier finding on filariasis [6]. Unlike the situation in malaria and schistosomiasis infections, the highest prevalence rates were recorded in adults over 25 years old. Trypanosomiasis was also recorded in only 3 adult nomads over 41 years of age. This prevalence rate is comparatively lower than that of Haraldson [14] who found that trypanosomiasis was a very serious obstacle for pastoralism in Ethiopia. This observation could be due to the effort of the Nigerian Institute of Trypanosomiasis Research in biological control of the vector. Hansen *et al.* [13] discovered that in 83 adult Kalahari Bushmen living as nomad hunter-gatherers in South Africa, some medical conditions like obesity, heart disease, cirrhosis, hypertonia, varicose veins, and rheumatoid arthritis were not seen. They found that hunting accidents were common. Comparable studies by the same investigators on nomadic Masai in Kenya gave about the same picture of a surprisingly healthy population. In the present study, several parasitic infections were observed among the nomadic Fulanis of south-eastern Nigeria. Considering the fact that the life of this group of people is important to the public, their well-being should be protected. Therefore, provision of prophylactics, prevention, treatment and control of parasitic infections amongst nomadic Fulanis in this part of Nigeria is necessary. Thus, provision of good infrastructures (schools, good housing), good portable water (boreholes) in every bush encampment or within reach of the Fulanis by governments is important. This would help in minimizing the occurrence of some of these parasitic infections among the people. In addition, the government should provide from time to time, mobile clinics [11] to various nomadic bush encampments for their medical problem, as is presently done in Ebonyi State (Anosike, unpublished data). This is necessary for free laboratory diagnosis of nomads as well as subsidized treatment. Health education in their local languages should be vigorously mounted to highlight the principles of basic personal or community

hygiene, vis-à-vis the life cycle, mode of transmission (vector), as well as possible preventive measures of some the prevalent parasitic infections in the area. Furthermore, studies on the venereal diseases of nomads considering their social behaviour should be instituted. This would help proper documentation of the occurrence of these diseases. It is interesting to note that the general life styles and beliefs of the nomadic Fulanis contribute to their poor response during surveys and other health related campaigns. These may affect the actual results obtained, leading either to false low or false high prevalence of the disease. This calls for an in-depth study of the people's beliefs, provision of health facilities along with health education and chemotherapy. Generally, this will help in promoting the health and well-being of the nomads in south-eastern Nigeria.

Acknowledgement

We are grateful to the "Anchor Relief Foundation Nigeria" for sponsorship. We also appreciate all our interpreters in both the Hausa and Fulani languages during the tedious fieldwork activities in the various bush encampments. The clerical assistance of Miss Chioma Nwawuikie of Kachitech Nig. Ltd. Owerri is highly appreciated.

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