THE HELMINTHIC AND PROTOZOAL INFESTATIONS IN A RURAL POPULATION OF NORTHERN NIGERIA

Pages with reference to book, From 350 To 354

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Abstract

The prevalence of helminthic and protozoal infestations was studied among 778 individuals from a rural area of Northern Nigeria.
The principal helminths present were Necator americanus or hookworm (46.27%, Hymenolepis nana (2.31), Enterobius vermicularis (1.29%), Taenia saginata (1.16%), Ascaris lumbricoides (0.51%), strongyloides stercorlis (2.26%) and Trichuris trichiura (2.26%). The prevalence of hookworm infestations was 60.51 % in males and 34.51% in females (P< 0.001).
The principal protozoa were Entamoeba coli (22.24%), Giardia lambia (8.11%), Trichomonas hominis (4.87%), lodoamaeba butschlii (1.80%) and Entamoeba histolytica (1.41%). The cystic forms were more prevalent than the vegetative forms (JPMA, 35 : 350, 1985).

INTRODUCTION

Helminthic and protozoal infestations are common in Nigeria. However data regarding their epidemiology is scarce mainly based on hospital records and mostly pertaining to southern parts of the country[1-6]. The only notable studies from northern regions are those of Ramsay[7] and Collard[8], which were carried out more than two decades ago. Due to marked improvement in the socio-economic conditions of the country since its independence and particularly during the last decade, there was a need to re-assess the problem of parasitic infestation. It was with this aim that the present study was under-taken.

MATERIAL AND METHODS

The study was carried out during January and February 1984 in four villages situated about15 Kilometers from Katsina town. These villages, which are a venue for a long term communityoriented medical projects, are situated on the northern border of the country around 13° East and fall into Sudan zone of Savannah.The climate is dry and there is a single peak wet season, which is shorter and often more intense than the double peak wet season of southern parts. The average rainfall is about 11 inches and temperature ranges from 10 C to 40 C; March and April are the hottest months and the rainy season lasts from May to August. The vegetation is very heterogeneous and consists of trees with small to medium sized leaves and grasses. The sanitation for the water supply in the study villages is bore-holes. The sanitation for the area is poor. The residents are engaged in farming. The sanitary, environmental and economic conditions of all these villages are the same.
The total population of study villages was about 4500 and a 25% random sample of the population was drawn for the present study. However due to operational difficulties the specimens from only 778 individuals could be collected.
Small plastic containers, marked with the name and identification number of the individual were handed over to the persons concerned one day before the scheduled visit of medical team. The individuals were instructed in the use of these containers. The specimens were collected between 7 A.M. to 8 A.M. each day and immediately transported to the laboratory of General Hospital Katsina,

where the laboratory technicians, attached to research projects, examined them under the supervision of an experienced pathologist

Usually 20 to 30 specimens were collected daily and the time interval between passing the stool and its examination ranged from 1½ to 4 hours.

The smears were prepared with normal saline and examined under a light microscope. Subsequently each specimen was examined by original formalin-ether concentration technique of. Ritchie[9].

RESULTS

The age of the population studied, (352 males and 426 females) ranged from 6 months to 92 years, the mean being 22.87 ± 18.26 years.

The percentage incidences of protozoal and helminthic infestations have been shown in Table I and Table II respectively.

Table I

Distribution of Protozoa

Type	Number of Stools Examined	Stools Positive for Protozoa				Total	
		Vegetative Forms		Cysts			
		No.	%	No.	%	No.	%
Entamoeba coli	778	9	1.16	164	21.08	173	22.24
Entamoeba histolytica	778	3	0.39	8	1.03	11	1.41
Giardia lambia	778	28	3.60	35	4.50	63	8.11
Iodoamoeba butschlii	778	3	0.39	11	1.41	14	1.80
Trichomonas hominis	778	38	4.87	-	-	38	4.87
Total	778	81	10.41	218	28.02	299	38.43

Table II

Distribution of Helminthic Ova.

Type	Number of Stools examined	Stools Positive for Helminthic Ova.	
		Number	Percentage
Necator americanus	778	360	46.27
Ascaris lumbricoides	778	4	0.61
Hymenolepis nana	778	18	2.31
Taenia saginata	778	9	1.16
Enterobius vermicularis	778	10	1.29
Strongyloides stercoralis	778	2	0.26
Trichuris trichiura	778	2	0.26
Total	778	405	52.06

In 70.30% specimens a single parasite either protozoon or helminth was found; in 25.50% specimens two parasites either both helminths or both protozoa or one helmninth and one protozoon were found; while in 4.20% specimens three parasites either all helminths or ail protozoa or a mixture was found.

PROTOZOAL INFESTATIONS

Entamoeba coli (22.24%), Giardia lambia (8.11%), Trichomonas hominis (4.87%), lodoamoeba butschlii (1.80%) and Entamoeba histolytica (1.41%) were the principal protozoa present. Except for Trichomonas hominis, all these prbtozoa were present both in vegetative and cystic forms. However in each case the prevalence of cystic forms was higher than the vegetative forms.

HELMINTH INFESTATIONS

Hookworm (NTecator americanus) was present in 46.27% specimens followed by Hymenolepis nana (2.31%),. Enterobius vermicularis (1.29%)

Taenia saginata (1.16%), Ascaris lumbricoides (0.51%), Strongyloides stercoralis (0.26%) and Trichuris trichiura (0.26%).

Since Hookworm was the principal helminth present in the area, it was decided to study its epidemiology in more detail.

Table–III

Percentage Incidence of Hookworm in various Age Groups.

Age (years)	Male			Female			Total		
	Examined	Positive	%	Examined	Positive	%	Examined	Positive	%
0 - 4	44	13	29.55	66	10	15.15	110	23	20.90
5 - 9	69	28	40.58	70	24	34.29	139	52	37.41
10 - 14	33	30	90.91	27	13	48.15	60	43	71.67
15 - 19	28	18	64.29	59	24	40.68	87	42	48.28
20 - 24	18	13	72.22	39	20	51.28	57	33	57.89
25 - 44	94	65	69.15	99	34	34.34	193	99	51.29
45 - 64	48	32	66.67	52	16	30.77	100	48	48.00
⩾ 65	18	14	77.78	14	6	42.86	32	20	62.50
Total	352	213	60.51	426	147	34.51	778	360	46.27

Table III summarises the results of this analysis. As evident from this Table, the prevalence of Hookworm was higher in males (60.51%) as compared to females (34.51%), the difference being highly. significant (P<0.OOl). Among males the higtiest incidence was in 10-14 years's age group, while in females it was in 20-24 year's age group.

DISCUSSION

Table-IV

The Percentage Incidence of various Helminthic Infestation in Nigeria.

Authors	Year	Place	No. of subjects	Hookworm	Ascaris	Taenia	Trichuris	Strongy-loides	Hyme-nolepis	Entero-bius
Present Study	1979	Katsina	778	46.27	0.51	1.16	0.26	0.26	2.31	1.29
Ramsay	1934	Katsina	498	48.60	3.20	7.20	0.80	2.00	6.40	-
Collard	1962	Katsina	788	58.76	1.52	2.40	-	-	-	-
Ikejiani	1959	Ibadan	5664	24.56	42.34	-	12.09	3.74	-	2.29
Cowper & Woodhard	1961	Ibadan	21,701	25.90	26.50	0.17	18.50	3.30	-	-
Abioye & Ogunba	1972	Ibadan	1272	16.04	64.62	-	28.69	3.46	-	-
Gilles	1965	Akufu	600	70.00	71.00	-	47.83	-	-	-
Okpala	1961	Lagos	511	58.30	71.50	2.10	66.60	11.70	-	0.80
Obiamiwe	1977	Benin	6213	16.80	19.50	0.80	5.90	1.80	-	-

Table IV gives a summary of the various studies carried out about the helminthic infestation in Nigeria. Apart from the studies of Ramsay[7] and Collard[8], all previous studies have been carried out in the southern part of Nigeria and only those of Gilles[4], Abioye and Ogunba[5], Ogunba[6] have some data

collected from the field; the rest being interpretations of hospital records.

A perusal of Table IV indicates that apart from other major differences in the pattern of helminthic infestation between the northern and southern part of the country, multiple infestations are more prevalent in the south as compared to the north.

The incidence of hookworm infestations in this study (46.27%) is higher than that observed by various investigators from south. A higher incidence of hookworm infestation in Savanna area like Katsina as compared to the Benin and Ibadan which are situated in the rain-forest zone seems to be a paradoxical finding, because in Savanna the soil gets so dry that the larvae of hookworm cannot survive[10]. The lower incidence quoted by these investigators from south may be due to the type of population studied as well as to the inherent selectivity of hospital records on which their studies are based. Most of these investigators have studied urban populations living in and around large cities. The cities have much better sanitary conditions, both personal as well as environmental, as compared to villages. The majority of population in the present study are farmers and invariably work bare-footed when engaged in fields, which is an important factor in acquiring hookworm infestations.

Further support is lent to this argument by the study of Gilles[4] who examined 600 stools in Akufu, a village about 15 kilometer from Ibadan and found a 70% incidence of Hookworm infestation. The results of present study would have been doubted, had Ramsay[7] and Collard[9], who carried out their surveys in Katsina not quoted similar incidences of 48.60% and 58.76% respectively. The incidence of Hookworm infestations was higher in males than females - a fmding also reported by Nawalinski et al[11] from West Bengal in India.

Our population was primarily rural and the age of highest prevalence coincides with the age when males in this area start actively participating in field work on farm and are therefore at more risk to acquire helminthic infestation. The youngest victim of hookworm infestation was aged 6 months and out of 360 positive cases 24 (6.66%) were less than 5 years old.

The incidence of Ascariasis was 0.51%. The incidences quoted by Ramsay[7] and Collard[8] are 3.20% and 1.52% respectively. However the incidence reported by various authors from the south ranges from 19.50%[12] to 71 .50%[2]. This difference can be explained on geo-climatic basis. The Ascaris eggs developed best in shady damp clay soils where the transmission is almost perineal[13] Since the southern parts of Nigeria are situated in the rain-forest zone, their topographic and climatic conditions are ideal for the survival and transmission of Ascaris.

The incidence of Taeniasis reported in this study is almost identical with the findings of Obiamiwe[12] Okpala[2]. However the incidence of trichuriásis and Strongyloidiasis were much higher in the above two as well as in those of Ikejiani[1] and Gilles[4] as compared to finding of the present study or those of Ramsay[7]. The difference can again be attributed to topographic factors, because like Ascaris the Trichuris and Strongylodes also flourish in wet and moist soils, which are rare in the north.

The most commonly prevalent protozoon was Entamoeba coli and its incidence recorded in this study (22.24%) is higher than that quoted in all the studies reported from the south. Similarly the prevalence of Giardia lambia, Trichomonas hominis, and lodoamoeba butschlii was higher in the present series as compared to others[6,12]. The prevalence of Entamoeba histolytica was 1.9%, 4.20%, 10.9%, 12.00%, and l2e99% in other series[2,3,4,6,12] as compared to an incidence of 1.41% observed in Katsina. One of the reasons for lower incidence of E.histolytica in this study may be the time lapse between passing the stools and their examination. Although every effort was made to ascertain the time of passing stools as correctly as possible and then to analyse those at the earliest yet as with all major surveys, at times unavoidable circumstances hindered the smooth operations. Trophozites of E. histolytica are known to disintegrate within two hours of their exit from the body and the delayed examination may have resulted in missing some positive findings. All those harbouring E. histolytica were 30 years or above and no case was found in children.

The observation of Obiamiwe[12] seems correct that the absence of certain parasites like Taenia solium, Diphyllobothrium latum, Dientamoeba fragiles etc. in such surveys may be due to the method of cooking and the type of food consumed. All subjects were Muslims and as such they do not eat pork. Meat is always over cooked and is almost dry before consumption.

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