

A PRELIMINARY REPORT OF INTESTINAL PARASITES
IN ADULT MIGRANT FARM WORKERS IN NORTH CAROLINA

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INTRODUCTION:

There is very limited information on the parasitic diseases of migrant farm workers and their families in North Carolina. An indication of the severity of the problem can be found in a published report on parasitic infections of migrant farm workers from the Delmarva Peninsula, Maryland (1). This report showed that of 339 individuals surveyed, 34.2% were infected with at least one intestinal parasite, and that 17.7% were infected with a pathogenic parasite. The highest prevalence rates were with Giardia lamblia (13.3%) and Trichuris trichiura (9.7%). However, a significantly high prevalence was also demonstrated for a number of other parasites, such as hookworm. The prevalence observed in migrant farm workers from the Delmarva Peninsula appeared similar to that observed in children 0 to 5 years of age in day care centers servicing the migrant farm worker community of the Tri-County (Harnett, Sampson, and Johnston) area of North Carolina (results to be reported separately). Based upon the results in Maryland and those in the

North Carolina day care centers, it was believed of interest to determine the prevalence rates in adults from migrant camps in the same area of North Carolina.

The Tri-County area of North Carolina contains an estimated 30,000 migrant farm workers living in some 300 different migrant camps. The size, ethnic origin of the inhabitants, and the socio-economic setting vary considerably between the individual camps. The major groups are American Blacks, Mexicans, Haitians, and Central Americans. The study consisted of two parts. The first was to examine one, preferably two, stool samples from each individual surveyed within a camp. The second phase was for a worker of our field team to administer a questionnaire to each migrant who supplied a stool sample. The questionnaire included variables such as country of origin, time of residence in the United States, socio-economic parameters, health parameters, occupational conditions, etc. The percent participation in the intestinal parasites survey varied by ethnic group -- from below 30% for Americans to nearly 100% for Central Americans, and for the questionnaire 80%.

The preliminary data to be presented here will first briefly analyze the prevalence of intestinal parasites in the total population surveyed, and then will discuss the prevalence rates in individual camps and according to the migrants' country of origin.

SUBJECTS AND METHODS:

The study population consisted of migrant farmworkers, primarily adults, living in labor camps in Sampson, Harnett, and Johnston counties, although some children were included. Camps were the sampling unit. Although a convenience sample was used, we included a comprehensive range of parameters which were examined. Our sample was also highly dispersed geographically.

Subjects were recruited by explaining the purposes of the study and the offer of diagnosis and treatment. The guarantee of dispensation within the camps of any necessary pharmaceuticals was essential in obtaining compliance.

We attempted to obtain more than one stool sample from each subject, but this was not accomplished in all cases. Transport kits containing preservative were provided each subject, who then prepared the sample. Samples were picked up from camps and processed in the parasitology facility on the grounds of the Tri-County Community Health Center in Newton Grove, N.C. Screening for helminthic parasites was accomplished by formalin ethyl-acetate concentration, iodine staining, and microscopic examination. For detection of protozoa, microscopic examination with iodine and Tri-Chrome stain was used. All samples were read by two different individuals trained in identification of parasites. Quantification of helminthic infections is currently being conducted with preserved specimens, in order to determine the intensity of infection and its correlation with other variables.

Subjects were notified of results within three days, and appropriate pharmaceuticals were dispensed in the camps by a Physician's Assistant.

RESULTS:

The study included 265 individuals in some 24 different migrant camps. The prevalence of intestinal parasites was 64.5%, and the prevalence of pathogenic parasites was 42.2%. The highest prevalences were found for hookworm and Trichuris trichiura infections. However, the rates for all the pathogenic parasites were above those reported for non-migrant communities. The data shown in Table 1 also clearly demonstrates that the prevalences were not equal for all ethnic groups. The individuals from Central America or Haiti had considerably higher levels of helminthic infections. Both the American and Mexican groups had limited pathogenic parasites. The prevalence rates observed

in the Haitian and Central American migrant farm worker populations paralleled those reported from their countries of origin. In fact, in some camps, the prevalence of hookworm infections is higher than that in many areas of the subjects' country of origin.

The prevalences of the pathogenic parasites observed in the individual camps showed large differences. For example, the American Camp 01 had a prevalence of 30% (predominantly Giardia infections), whereas individuals from several other camps did not demonstrate any pathogenic intestinal parasites (Table 2). In some cases, only a single stool sample was obtained, therefore the total absence of parasites cannot be stated with absolute certainty. However, the results do indicate a certain difference in the parasite burdens observed in the different camps. The prevalences for the individual camps are also shown according to the predominant ethnic origin of individuals in each camp. It is again obvious that the rates for the Haitian and Central American camps are generally higher than those of the American or Mexican camps. However, it is important to note the considerable variability was also observed in the Haitian camps. It can be observed by comparing Tables 1 and 2 that very high prevalences for the potentially serious pathogenic intestinal parasites, such as hookworm, E. histolytica were observed.

The length of time the migrants have been in the U. S. without returning to their country of origin was asked in the questionnaire given to each participant. A summary of the responses is shown in Table 3. It can be observed that the individuals in a number of these camps have remained in the U. S. for many years. The time of residence in the U. S. is also compared with the prevalence of pathogenic parasites in the same camps. It is obvious that the prevalence does not appear to be correlated with the average length of the migrants' stay in the United States. In addition, variables commonly associated with the transmission of those parasitic infections were also

surveyed in the questionnaire. The summary of the responses to these questions can be found in Table 4. It becomes obvious from the data that sanitation facilities in the work fields are usually not present, and that defecation in the field commonly occurs. In addition, it is apparent that a high percentage of migrants do not wear shoes while working in the field, and often fail to do so in their camps. It is apparent that the risk for transmission is increased in the migrant community, particularly in reference to hookworm infections.

DISCUSSION:

The preliminary data presented here are similar to the results of the survey of migrants from the Delmarva Peninsula. (1, also found in Migrant Health Newslines Clinical Supplement, May/June 1986.) The differences are that the prevalence rates observed in the Tri-County area of North Carolina are overall considerably higher for the pathogenic parasites, and specifically for the prevalence of hookworm and E. histolytica. This is of considerable public health importance, since the very high prevalence rates could suggest significant clinical disease in this population. Although the survey was not designed to measure overt clinical illness among the infected individuals, their lean body build and their frequent comments that individuals knew of others who were involved in earth-eating would be consistent with the symptoms and behavioral changes associated with serious hookworm infections. We therefore believe it is important for physicians treating migrants to beware of the potential problem of pathogenic intestinal parasites as the cause of their clinical illnesses, especially among migrants of Haitian and Central American origin. The similarity between the prevalences of intestinal parasites among Haitian and Central American migrant farm workers with those reported from their country of origin would also suggest that other serious parasitic infections might also be observed among these populations. It is

predicted that cases of filariasis, cysticercosis, malaria, and Chagas' disease will be found. It has previously been observed that 6.7 % of Haitian migrants surveyed in a Florida study had filariasis (2). Similarly, a prior study also documented cases of autochthonous malaria in Mexican migrant farm workers in California (3). Therefore, physicians should be aware of the possibility that migrant farm workers have a much greater possibility of having clinical disease due to parasitic infections than individuals from other non-migrant communities. The treatment of migrant farm workers in North Carolina, Maryland, and elsewhere would be equivalent to working in the field of tropical medicine.

It has clearly been shown that the prevalence rates of parasitic infections depended upon the migrant's country of origin, and the specific camps in which they resided. There was no obvious correlation between the prevalences and the length of residency in the United States. Camps in which the migrant farm workers live differ in reference to the degree of crowding, their cleanliness, and the facilities for personal hygiene. Occupational conditions in the field indicate a low level of field sanitation. Based upon the physical setting in which the migrants live and work, and the high prevalence of parasitic infections in their countries of origin, the possibility that endemic transmission of the intestinal parasites occurs in some of these camps seems reasonable. Although we do not yet have the incidence data necessary to prove this suggestion, there are a number of observations which we believe are consistent with an endemic transmission. First, the higher-than-background prevalence rates of American migrants; the frequent occurrence of intestinal parasites born in children in the U. S. of migrant parents; the inability to observe a consistent decrease in prevalence with the length of continuous residency in the United States; and, finally, the rather large differences in the prevalence observed between individual

camps with individuals of similar ethnic origin would all suggest that an endemic cycle exists in some camps. The public health approach to reducing pathogenic intestinal parasites from the migrant farm worker population would differ considerably if migrants simply brought their parasite burdens with them from their countries of origin versus if the initial parasitic infections were complicated by endemic transmission. This question of endemic transmission cycles within migrant camps is therefore very important.

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TABLE 1

PREVALENCES OF IMPORTANT INTESTINAL PARASITES IN MIGRANTS

	American (%)	Mexican (%)	Central American (%)	Haitian (%)
<u>T. trichura</u>	3	3	46	21
Hookworm	0	3	51	19
<u>Ascaris</u>	0	1	7	2
<u>H. nana</u>	0	3	7	2
<u>G. lamblia</u>	6	7	12	1
<u>E. histolytica</u>	0	8	5	12

TABLE 2

PARASITE PREVALENCE IN INDIVIDUAL MIGRANT CAMPS

CAMP NO.	ETHNIC ORIGIN	NO. INDIVIDUAL SUBJECTS	PREVALENCE (%) PATHOGENIC PARASITES
01	American	13	30
02	American	13	0
15	American	19	5
20	American	10	0
22	American	6	0
24	American	8	0
07	Mexican	2	0
08	Mexican	10	60
12	Mexican	22	0
16	Mexican	7	51
17	Mexican	8	25
21	Mexican	6	0
25	Mexican	8	13
06	Haitian	14	50
09	Haitian	9	22
10	Haitian	10	70
14	Haitian	11	36
11	Haitian	8	50
18	Haitian	8	62
19	Haitian	10	50
23	Haitian	11	36
03	Central American	29	67
04	Central American	12	83
13	Central American	11	64

TABLE 3

PARASITE PREVALENCE VERSUS YEARS IN U.S.

CAMP NO.	ETHNIC ORIGIN	NO. INDIVIDUALS	PREVALENCE (%) PATHOGENIC PARASITES	AVERAGE YEARS IN THE U.S. ^a
01	American	13	30	U.S. Born
16	Mexican	7	51	5.0
17	Mexican	8	25	14.5
09	Haitian	9	22	1.5
10	Haitian	10	70	3.5
14	Haitian	11	36	4.1
04	Central American	12	83	4.1
13	Central American	11	64	2.4

^aAverage continuous years in the U.S. Individuals who returned to their native country were excluded from the calculations.

TABLE 4

FREQUENCY OF SELECTED VARIABLES ASSOCIATED WITH
RISK OF TRANSMISSION OF INTESTINAL PARASITES

	American (%)	Mexican (%)	Central American (%)	Haitian (%)
Presence of Field Sanitation Facilities				
always	15	12	12	0
sometimes	2	3	3	2
never	80	84	86	98
Frequency of Defecation in Fields				
always	20	28	6	7
sometimes	60	50	41	53
never	25	22	43	41
Frequency of Working Without Shoes				
always	18	19	24	3
sometimes	35	3	6	12
never	46	78	70	85
Frequency of Going Shoeless in Camps				
always	11	28	25	47
sometimes	44	16	16	35
never	44	56	59	19