Presumptive anti-helminthic treatment and enteric parasite infections in Minnesota primary refugees between 2010 and 2013

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Introduction

The United States resettles up to 80,000 refugees annually. Before resettlement, refugees undergo mandated health screenings (1). The Centers for Disease Control and Prevention (CDC) defines, oversees and monitors these health screenings, in accordance with the Refugee act of 1980 (1).

The updated guidelines for overseas presumptive treatment of intestinal parasites introduced by the CDC in 2008 (3), resulted in an increase of the proportion of refugees arriving to Minnesota with treatment documentation, from 2% in 2010 to 50% in 2013.

The objective of this evaluation was to compare the prevalence of parasitic infections among primary refugee arrivals to Minnesota with documentation of overseas anti-helminthic treatment to those without documentation, between 2010 and 2013.

Methods

We conducted a retrospective cohort study involving 8,306 primary refugees who arrived in MN between 2010 and 2013. These refugees were screened by means of complete blood count screening for eosinophilia, microscopical examination of stools specimens (Ova & Parasite exam), and serology tests for Schistosoma or Strongyloides antibodies.

The anti-helminthic treatment received by refugees prior to departure for the United States is determined based on the region of departure and the species of pathogenic parasites endemic to the region. These guidelines are detailed by the CDC (3).

The documentation of presumptive parasitic overseas treatment was collected from the CDC's Electronic Disease Notification, and the domestic screening results were collected through the Minnesota Department of Health's refugee health database.

Adjusted prevalence ratios for parasitic infections were calculated among refugees with and without documented treatment using a log binomial regression model, after adjusting for country of origin and age.

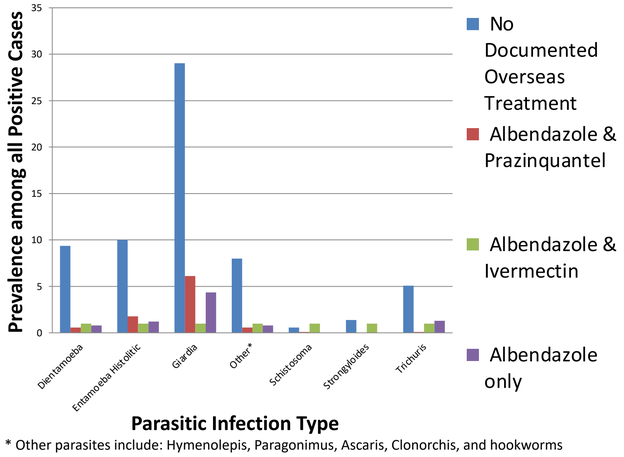
Results

Table 1. Characteristics of primary refugees screened in Minnesota based on departure information, 2010 – 2013.

Characteristic		Total Arrivals to MN	Albendazole only (%) *	Albendazole and Ivermectin (%) *	Albendazole and Praziquantel (%) *	No documented overseas treatment (%) *	Total Receiving RHA (%)**
Region of Origin***	Americas	74	0 (0%)	0 (0%)	0 (0%)	52 (100%)	52 (70%)
	Asia	4285	564 (13.3%)	1519 (36.0%)	0 (0%)	2143 (50.7%)	4226 (98.6%)
	Eastern Europe	132	0 (0%)	0 (0%)	0 (0%)	126 (100%)	126 (95%)
	Middle-East	631	32 (5.2%)	0 (0%)	0 (0%)	587 (94.8%)	619 (98.1%)
	Sub-Saharan Africa	3430	132 (4.1%)	18 (<1%)	932 (28.9%)	6147 (66.5%)	3229 (94.1%)
Sex	Female	4232	363 (8.9%)	734 (18.1%)	428 (10.5%)	2537 (62.5%)	4062 (96%)
	Male	4326	365 (8.7%)	803 (19.2%)	504 (12.0%)	2518 (60.1%)	4190 (96.8%)
Age	N (x̄)	8558	728 (17.9)	1537 (25.8)	932 (24.6)	5055 (22.7)	8252 (23.0)

*Recommended treatment regimens are based on the parasitic infection endemic to the region of departure for refugees.
**RHA: refugee health assessment (>97% of eligible refugees received a refugee health assessment from 2010 to 2013)
***Asia includes Bhutan, Burma (Myanmar), Cambodia, China, Laos, Nepal, Philippines, Tibet and Vietnam. Americas includes Cuba, Haiti and Mexico. Eastern Europe Includes Armenia, Belarus, Russia, Ukraine, Kyrgyzstan, Uzbekistan and Moldova. Middle East Includes Afghanistan, Iran, Iraq, and the West Bank. Sub-Saharan Africa includes Burundi, Cameroon, the Democratic Republic of Congo, Eritrea, Ethiopia, Gambia, The Guinea, Ivory Coast, Kenya, Liberia, Mali, Sierra Leone, Somalia, Sudan, Tanzania, The United Republic of Togo, Rwanda, Uganda and Zimbabwe

Figure 1. Prevalence of intestinal parasitic infections by O&P exam, according to overseas treatment status, before departure for the United States.



* Other parasites include: Hymenolepis, Paragonimus, Ascaris, Clonorchis, and hookworms

Table 2. Prevalence ratios of parasitic infection according to overseas treatment documentation status, adjusted for country of origin and age at arrival.

Variable	Prevalence Ratio (95% CI)
Any Documented Overseas Treatment	0.92 (0.87 - 0.97)
Albendazole	0.89 (0.81 - 0.98)
Albendazole & Ivermectin	0.88 (0.82 - 0.95)
Albendazole & Prazinquantel	1.01 (0.92 - 1.11)
No Documented Overseas Treatment	1

Among the 8,306 primary refugees who received a domestic refugee health assessment between 2010 and 2013, 3,197 (38%) had documentation of some overseas treatment; and, 8,298 (99%) were screened for parasites. Of these, 520 (16%) with any documented overseas treatment tested positive for ≥1 pathogenic parasite using an ova and parasite stool exam and/or serology, compared to 895 (18%) of those without documented treatment (adjusted prevalence ratio: 0.92; 95% CI, .87-.97). This effect was also observed in the Albendazole vs. No documented treatment groups, and the Albendazole & Ivermectin vs. No documented treatment groups. The most common parasitic infections observed were Giardia (n=616, or 49.7% of all positive cases), Entamoeba Histolitic (n=207, or 16.7% of all positive cases), and Dientamoeba (n=172, or 13.9% of all positive cases).

Conclusions

Approximately 25% of the world's population is infected with intestinal helminths. These neglected tropical infections disproportionally affect the world's least privileged and are among the most common conditions in refugees (2).

Our results show that refugees with evidence of overseas anti-helminthic treatment were significantly less likely to have any parasitic infection upon U.S. arrival compared to those with no evidence of overseas treatment, suggesting the effectiveness of this overseas initiative (Prevalence Ratio 0.92: 0.87 – 0.97 95 % CI).

Our study had limitations. Because the treatments were not randomized, only temporal associations between presumptive therapy and prevalence of infections can be determined. To limit the effect of the changing composition of the refugee population coming to Minnesota, we controlled for important demographic factors such as age and country of origin, but we were unable to control for underlying changes within the country of origin.

Our future studies will examine the effectiveness of each specific anti-helminthic treatment on the prevalence of specific intestinal parasites: One 400 mg Dose of Albendazole is recommended for presumptive treatment of soil transmitted helminths, but this has limited efficiency against Strongyloidiasis and Schistosomiasis (3). 2 Doses of 200 µg/kg/day of Ivermectin are recommended for the former, and one dose at 40mg/kg of Prazinquantel is recommended for the later(3).

Bibliography

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