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Original

Prevalence of intestinal parasites in food handlers in a rural community in Cojedes, Venezuela

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Abstract

Aim: Intestinal parasites are a public health problem due to their high prevalence. Handlers of food contaminated with parasites become potential sources of infection because some parasitic forms are transmitted directly from the source of infection to the host through the fecal-oral route. In addition, there is an increased consumption of food outside the household by residents of urban and rural areas. The objective is to collect information so that health authorities implement health programs appropriate to each region.

Methods: Descriptive and cross-sectional field-study. Sixty-four food handlers participated but the sample was composed of 50. A questionnaire on hygienic practices in food handling was administered. The socioeconomic status was determined, as well as prevalence of parasites by performing stool tests.

Results: The sample was composed of44 women and 6 men, 52% belonged to the IV stratus; most knew about hygienic practices in food handling but 26% had some form of intestinal parasites; the most frequent were: E. nanny (41.2 %) and B. hominis (38.7 %); monoparasitism was 54%.

Conclusion: Several factors are involved in the occurrence and frequency of intestinal parasitic disease. Therefore, educating food handlers about good hygiene practices according to the environment is essential to prevent transmission.

Key Words: Intestinal parasite, food handler, habits, feces, prevalence.

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Intestinal parasites are a public health issue, nearly 2000 million people are at risk around the world, 300 million have associated morbidity and 155000 die annually.[1-5] The etiologic agents include: *Ascaris lumbricoides, Trichuris trichura, Ancylostoma duodenal Entamoeba histolytica* and *Giardia intestinalis*, the global prevalence of ascariasis is estimated in 1450 million, 1050 million for trichuriosis and 1300 million are infected with hookworm, amoebas cause 450 million infestations and about 100,000 deaths per year; and finally, giardiasis is considered the most common parasite disease in children, responsible for no less than 4000 hospital admissions each year.[6]

Clearly, these conditions are also important because they show a high prevalence in tropical and subtropical countries, especially Latin-America. Nearly 20-30% of these reported intestinal parasitosis, increasing to 50-95% in low socioeconomic areas, because they meet a number of environmental and socio-cultural factors associated with a higher risk of disease, such as: poor

personal hygiene, inadequate housing, difficulty in access to health services, low education, poor environmental sanitation and failures in water supply, defining characteristics of rural and poor zones of urban centers. [7-11] Therefore, individuals harboring high parasite loads are frequently found, which definitely increases parasite transmission, especially when there is inadequate food handling.[1,12,13]

Even though in Venezuela a health certificate is mandatory for food handlers, this is annually renewed, therefore, health control is late, enhancing the role of enteroparasite spread by food handlers, with special emphasis on those preparing food, considered high risk not for the possibility of becoming ill, but because their work implies a higher responsability.[13] It should also be taken into account, the increase in food consumption outside of the family core, initially for urban areas, but now also for rural areas because of transculturation, where itinerant food stands now appear and persist over time.[13-15]

Thus the aim of this work was to investigate the epidemiology (gender and socioeconomic conditions) and hygiene practices to prevent enteroparasitic diseases in food handlers, at the rural community of Manrique, Cojedes State, Venezuela, a region like others in the country, with economic delay and underdevelopment, where never made such studies in order to provide information on such diseases to health authorities, to implement health programs appropriate to the reality of life in each region.

Method

Population and Sample: This was a descriptive, field and transverse study. The research was conducted at the Manuel Manrique parish, located at 480m altitude, upstate Cojedes, Venezuela, selected for being an area with distinctly rural socioeconomic characteristics and, though unofficial, with reported cases of food-transmitted diseases. In this area, the food handler population was of 64 (including educational institutions and food vendors). The sample, once explained the research objectives and obtained the informed consent from the mentioned individuals, completed 50 people, and none had received antiparasite treatment at least two weeks before sampling. People from both genders and all ages were included.

Hygienic practices and socioeconomic status: In accordance with the study´s objectives, a research questionnaire was applied, commonly used in other areas of the world, but validated by specialists in the field, to be applied in the study area, to measure preparation, service and kitchenware cleaning hygiene practices, followed by the Manrique community subjects in terms of food handling.

In each questionnaire a maximum score of five (5) points and a minimum of one (1) was established for each item. To determine these scores, each subject was given three response options: never (1 point), sometimes (2 points) and always (3 points), in five of seven questions, based on which the proposal was evaluated, for this purposes, each option was signaled with an "x"; there was only one dichotomous question and another one showed two possibilities. The Graffar method, modified by Méndez-Castellano was applied to determine the family´s socioeconomic status on the sample, which allowed grouping into five socioeconomic strata: I (high quality of life), II (moderate quality of life), III (low quality of life), IV (relative poverty) and V (extreme poverty).[16] Similarly, identification and filiation data were recorded.

Processing and analysis of stool samples: The samples were analyzed by specialized personnel, using the direct stool examination, which uses isotonic saline (0.85% NaCl). Also, the modified direct method was used, which is based on Lugol´s iodine solution (1.5 g iodine, 4 g potassium iodide and 100ml distilled water), a technique that allows to dye some parasite structures, in order to facilitate recognition and identification. This was the employed proceeding: a small portion of stool was taken with a swab and put into a saline suspension, and the same was made with Lugol´s iodine.

The resulting preparations were coated with 22x22mm cover glasses and analyzed microscopically with 10x and 40x zooms. As a complementary aspect of this research and to identify helminth eggs; Kato Katz, Willis and Faust concentration methods were applied.[17, 18] All individuals with intestinal parasites were treated with specific anti-parasitic drugs. Serial parasitological examinations was the preferred method to determine intestinal parasitosis.[19]

Statistical analysis: Data obtained from both questionnaires: measures for food handling practices and measures to assess socioeconomic status, as well as, gender-related data and coproparasitologic test results, were introduced in a database created with the Epi Info 5.0statistical program.[20] The obtained information was analyzed through descriptive statistic methods.

Results

The sample consisted of 50 apparently healthy food handlers, between ages 20-40, 44 women (88%) and 6 men (12%). Of these individuals, 52% belonged to stratum IV (relative poverty), 34% to stratum III (low quality of life), 10% to II (moderate quality of life) and 4% belonged to socioeconomic stratum V (extreme poverty), none qualified for stratum I (quality of life), according to the Graffar

Table 1. Distribution of hygienic sanitary measures among food handlers; Manrique, Cojedes State, Venezuela

Hygiene practices	Answer	Frequency	Proportion (%)
Glove utilization	Always	8	16
	Sometimes	10	20
	Never	32	64
Hand-washing before food preparation	Always	41	82
	Sometimes	9	18
	Never	0	0
Hand-washing before using the restroom	Always	38	76
	Sometimes	12	24
	Never	0	0
Vegetable washing	Always	47	95
	Sometimes	3	6
	Never	0	0
Protection against flies and insects	Always	50	100
	Sometimes	0	0
	Never	0	0
Water used for food preparation	From Pipeline	27	54
	Boiled	23	46
Sanitary inspection	Yes	18	36
	No	32	64

Source: Questionary about hygiene practices in food handling

socioeconomic stratification scale, modified by Méndez-Castellano.[22]

Regarding hygiene practices followed by the subjects, over 75% of individuals referred washing their hands after using the restroom and before preparing food, but 64% do not use gloves to serve it. Also, between 95-100% of them wash vegetables before preparing them and protect food from arthropods. However, only 46% use boiled water and receives sanitary surveillance (Table 1).

Stool analysis showed 13 individuals (26%) with some intestinal parasitosis, including all men, but 37 (74%) did not show intestinal parasites (Table 2). The parasite species, all protozoan, most frequently observed in positive samples were: *Blastocystis hominis* (38.5%), *Endolimax nana* (23.1%), *Entamoeba coli* (15.4%), *G. intestinalis* (15.4%) and *Iodamoeba butshilli* (7.6%) (Table 3). As for the number of infecting species, 54% were parasitized by single species and the rest (46%) had two or more parasites (Table 4). The predominant parasite association was between B. hominis and E. nana (27%).

Table 2. General prevalence for intestinal parasitism in food handlers, Manrique, Estado Cojedes, Venezuela

Food handlers	Frequency	Proportion (%)
Infected	**13**	**26**
Non infected	**37**	**74**
Total	**50**	**100**

Source: Stool analysis

Table 3. Distribution of parasites in positive stool samples from food handlers in Manrique, Cojedes State, Venezuela

Parasite	Frequency	Proportion (%)
Blastocystis hominis	5	38,5
Endolimax nana	3	23,1
Entamoeba coli	2	15,4
Giardia lamblia	2	15,4
Iodamoeba butshilli	1	7, 6
Total	**37**	**100**

Source: Stool analysis

Table 4. Distribution of infected food handlers, according to number of parasite species. Manrique, Cojedes State, Venezuela

Quantity	Frequency	Proportion (%)
One	7	54
Two or more	6	46
Total	**13**	**100**

Source: Stool analysis

Discussion

The female over male prevalence could be because the number of male representatives in the sample was affected by work reasons, because men are mainly involved in agricultural activities in the area, or other tasks that require moving to urban regions in the Cojedes State, and women continue in their ancestral profession of cooking. Relative and extreme poverty is the predominant socioeconomic feature in this study area; this was already expected, since the Venezuelan society is between two statuses: I, representing 1,06% of the entire population, and strata IV and V, which represent 42%.

Also, food handling hygiene measures can be considered relatively satisfactory, although a proportion of the sample,

regardless of their socioeconomic class, had parasites transmitted through the fecal-oral route, which shows the ease of transmission from person to person, despite State health controls.13 Possibly, the knowledge they have about proper food handling is the product of information transmitted by communication media.[22-24]

Oral-fecal transmission of parasitosis in food handlers registered in this study (26%), is similar to that reported in populations from Brazil (17%) and Colombia (17%), and the prevalence of protozoa, a phenomenon that is probably a result of inadequate sanitation and water supply.[13,25] *B. hominis* (38.5%) was the parasite with the highest incidence, above the national average (around 10%), followed by *E. nana* (23.1%), protozoa with a doubtful pathogenicity, but considered markers of fecal-oral contamination, and which together constitute the predominant parasitic association in this writing (27%). Similar studies in other Latin American countries show, for example, that polyparasitism (46% of cases) reported in this investigation is twice higher than that found in Nicaragua; and regarding the most frequent parasite infecting people, described findings are similar to those reported in Chile, where *E. nana*, with 46.6%, was the most found, followed by *E. coli* (41.2%) and *E. histolytica* (12.1%)[13,15,25-29]

Towards the inner side of Venezuela, specifically in the Zulia State, the prevalence of parasites, especially protozoa, was 48.7%, as in this work. There were also *E. nana* (41.2%) and *B. hominis* (38.7%) the most commonly found parasites. Similarly, but as a discordant point with this investigation, monoparasitism and infection by A. lumbricoides was more frequently found in Zulia.30 Farther southeast, in Bolivar State, it was also signaled a high prevalence of intestinal parasitosis, as it reaches 36.1%, and B. hominis was equally frequent (25.7%).[31]

It has been told that the solution is not to eradicate street food vendors, but getting people to understand the essentials of hygiene in food preparation, within formal health programs, consistently applied, with continuous monitoring, focused and adhered to the local and cultural aspects that define each population.[32-34]

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