Care-seeking behaviour and diagnostic processes for symptomatic giardiasis in children attending an academic paediatric hospital

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Giardiasis is one of the commonest intestinal parasitic infections in Cuba. In order to determine care-seeking behaviour and diagnostic processes in paediatric in-patients with giardiasis, structured questionnaires were administered by interview mothers of children with giardiasis during January to December 2010. During the study period, 97 children were diagnosed with giardiasis, of whom 86 (88.6%) caregivers were interviewed. The median number of days from symptoms onset to the first presentation in a health unit was 2 days (range: 0–15 days). The pattern of care-seeking behaviour was variable; 41 (47.7%) of children initially visited the emergency unit in a paediatric hospital. Sixty-six children had, at least, one further contact for help before diagnosis of giardiasis was made (range: 1–5 contacts) and of the 128 contact visits, 94 (73.4%) were also targeted more to hospitals. There was a median time of 6 days between the first presentation to a health unit until diagnosis, which was mainly made by microscopic examination of duodenal aspiration. Among factors investigated in mothers, only knowing other person with giardiasis had significant association with their ability to suspect giardiasis [odds ratio (OR): 29.8, 95% confidence interval (CI): 3.71–239.4, $P=0.001$]. Requesting a faecal specimen or ordering duodenal aspiration for microscopic examination during the first visit appeared associated with correct diagnosis (OR: 3.84, 95% CI: 1.57–9.40, $P=0.003$). Efforts should be made to increase doctors’ awareness of- and diagnostic skills for childhood giardiasis. At the same time, it is necessary to improve caregivers’ awareness about giardiasis.

Keywords: Care-seeking behaviour, Caregivers, Cuba, Children, Diagnosis, Giardiasis

Introduction

Giardia lamblia is one of the major causes of parasitic diarrhoeal disease worldwide.¹ In Cuba, in the last national survey carried out in 2009, the overall prevalence of *Giardia* in human population was estimated to be 6.02%;² however, higher prevalences have been recorded among young children attending day-care centres^{3,4} and primary schools,^{5,6} and, according to hospital-based studies, it seems to be that clinical giardiasis is a common reason for hospitalization in paediatric hospitals.^{7–9}

As in other diseases, the diagnosis of giardiasis critically depends on the community’s perception of the disease, care-seeking behaviour of individuals, socio-economic factor, and the suspicion index of the health care providers.^{10,11} Care-seeking behaviour and diagnostic processes have been studied for several bacterial and parasitic infections, such as sexually transmitted diseases, malaria, and childhood diarrhoea.^{12–14} Although some of these aspects have been investigated in giardiasis in industrialized countries,^{15,16} there is a lack of investigations in developing countries, where this infection is mostly observed.

Improving families’ care-seeking behaviour could contribute significantly to reducing child mortality in

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developing countries. In Cuba, efforts have been made to inform general population about intestinal parasites transmission with educational talks on the radio, television, and programmes, promoting preventive behaviours according to World Health Organization recommendations (unpublished observations), although it should be recognised that it is not a simple matter to modify human behaviour.¹⁷

The purpose of our study was to obtain information about care-seeking behaviour and to determine the diagnostic processes of caregivers of children who were treated at the Academic Paediatric Hospital 'Centro Habana' (APHCH) for childhood giardiasis.

Patients and Methods

Context

In Cuba, medical attention is provided only by the public health system and is free of charge. The national public health system, primary, secondary, and tertiary cares operate as three interrelated levels. Primary care level includes small primary care centre staffed by a general practitioner and a nurse who work in the neighbourhoods and provide medical care for between 120 and 160 families, and community-based polyclinics (one per health area which covers about 30 000 inhabitants) where there is no 'in-patient' department but there are supporting specialists and technical backstopping (X-rays, echography, gastroscopy, biomedical laboratory, etc.). The secondary level is comprised of referral facilities, such as general hospitals (on average, one referral hospital per 150 000 inhabitants), and the tertiary level consists of specialized institutes and hospitals providing services with the most advanced technology.¹⁸ The population may seek care at any one of these levels on their own initiative, or they may be referred by their doctors from one level to another. Thus, a patient seen initially at the primary care level may ultimately be diagnosed and treated at the tertiary level.¹⁹

Study design, setting, patients, and data collection

This prospective study was conducted at the APHCH, a 226-bed hospital that provides medical care and active ambulatory and emergency services, within all clinical and surgical specialities, for children from all over Cuba, but mainly for children from the Centro Habana, Plaza, Cerro, and Habana vieja municipalities.

All the patients with diagnosis of giardiasis admitted to the APHCH from 1 January to 31 December 2010 — and their caregivers — were eligible for inclusion in this investigation. Structured questionnaires were completed by interview shortly after diagnosis (up to 24 hours) in private rooms. For each child, a questionnaire was administered and information was

collected on age, gender, date of the onset of illness, initial giardiasis-related clinical manifestations including continuous diarrhoea (defined as a change in the normal pattern of bowel movements with at least three loose stools daily, lasting for at least 4 days); intermittent diarrhoea (defined as complete resolution of diarrhoea for 24 or more hours followed by return of symptoms), abdominal pain, vomiting, decreased appetite, and weight loss. Notes were also made of the type of health unit first contacted for management of illness; the number of all subsequent contacts (health facilities attended and total medical consultations before correct diagnosis); who influenced the decision to present at the hospital; whether a faecal specimen or a duodenal fluid aspiration were ordered at the first visit; and the time interval between the onset of symptoms and the first diagnostic test for giardiasis confirmation (i.e. faecal specimens or duodenal aspirate). Time intervals between onset, first medical consultation, and the final diagnosis of giardiasis were determined.

Medical charts were also reviewed to confirm some details given by caregivers. In relation to them, basic demographic data (age and gender), employment status, and level of education were explored and recorded. Additionally, general questions were carried out focused on their suspicion of the potential diagnosis before the final diagnosis of giardiasis was given and their knowledge other person with giardiasis.

Questionnaire development

A draft questionnaire of care-seeking behaviour and diagnosis processes for giardiasis was created from open-ended (informal) key informant interviews. Key informants included medical and nurse staff and the heads of the diarrhoea and laboratory wards from APHCH. These discussions were conducted to become familiarized with and gather contextual data of local health practices. The questionnaire was then formulated and pilot tested by doctors, who were subsequently trained to administer it, on 15 randomly selected caregivers to validate its reliability. The questionnaire was amended to make questions more culturally appropriate.

Data management and analysis

Data from each patient were entered into Excel (Microsoft) database and then analysed using the Epi-Info version 6.0 software package (Centers for Disease Control and Prevention, Atlanta, GA, USA). Odds ratios (OR), their 95% confidence intervals (CIs), and *P* values were also calculated where appropriate. Each of the variables found to be significant associated in the univariate analyses was entered into a multivariate analysis model, using R.²⁰ The health care providers were classified as (1)

general practitioner dispensary; (2) casualty department in polyclinics; (3) out-patient clinic in a paediatric hospital; (4) casualty department in a paediatric hospital; and (5) others which include institute of gastro-enterology, out-patient clinic in polyclinics, and traditional healers. The ages of the children with giardiasis were categorized into children <1 year, 1–4 years, 5–10 years, and >11 years; their caregivers' age were categorized into caregivers <30 years, and ≥30 years for comparison.

Ethical considerations

This study was reviewed and approved by the Ethical Review Committee of the APHCH. Each potential respondent received information about the purpose of the study and was invited to participate. Caregivers were assured that all results would be confidential and not shared with their providers. Informed consent was obtained from all caregivers who participate in the study. All identifying information linking interview to individual subjects was destroyed at the conclusion of data collection and was replaced with an anonymous unique identifier.

Results

During the study period, a total of 97 children were hospitalized for giardiasis, from 86 of them [36 (41.9%) males and 50 (58.1%) females] their caregivers were interviewed; 88.6% response rate. The median age of children was 5 years (range: 0–18 years). Reasons for those who were not interviewed were not specifically documented but included children's early discharge from hospital, admission and discharge during the weekends or public holiday, and declining to participate.

The majority of the children presented with a combination of symptoms. However, the most frequently noticed and reported by mothers were vomiting [49 (57.0%)], abdominal pain [48 (55.8%)], and diarrhoea [48 (55.8%)]. Less common symptoms were fever, loss of appetite, and weight loss (Table 1).

First contact for help

The places of first contact for help and associated care-seeking behaviour are shown in Table 2. Forty-one (47.7%) of patients visited the casualty department in a hospital, while 30 (34.9%) and 14 (16.3%) visited the family doctor dispensary and casualty department in the polyclinic, respectively. No one reported visiting traditional healers. The median number of days from symptom onset to the first presentation in a health unit was 2 days (0–15 days). The decision about where to go for help was mostly made solely by the caregiver in 48 (55.8%) cases; it was influenced by a family member (mother in low, father in low, spouse, partner, grandmother, or aunt) in 19 (22.1%) cases. The majority of caregivers (73.3%) took their boy/girl by vehicle to the

AHPCH. There was only one contact for help in 21 (24.4%) children.

Subsequent contacts for help

A total of 65 children had a least one further contact for help before a diagnosis of giardiasis was made (range: 1–5 contacts). Details of these contacts are shown in Table 3. Of the 128 contact visits, 94 (73.4%) were also mostly made to hospitals, and relatively fewer visits at this stage were made to polyclinics (10.1%), family doctors (7.8%), and other sites such as out-patient service in a paediatric hospital and the institute of gastro-enterology, 6.2 and 2.3%, respectively.

Diagnosis and treatment of giardiasis

There was a median time of 6 days (range: 1–25 days) between the first visit to a health unit till the diagnosis. Information on faecal smear and duodenal aspirate results were given immediately as these patients were hospitalized, in this way they were put under anti-giardial treatment, mainly with tinidazole or secnidazole, according to the physicians' selection.

Caregivers' demographics, knowledge about giardiasis, and other related aspects

The mean age of caregivers was 31.7 years (SD: ±8.7 years). Forty-four (51.2%) of them were less than 30 years old. Table 4 shows details of the moment when the mothers thought their children had giardiasis in relation to age, educational level, and employment status. Being less than 30 years old (OR: 3.09, 95% CI: 1.22–7.82, $P=0.02$), having not studied at the university (OR: 3.71, 95% CI:

Table 1 Characteristics and presenting symptoms and signs of disease of the children diagnosed with giardiasis at APHCH, Havana, Cuba

Variable	Children (N=86)
	No. (%)
Demographics	
Age group	
<1 year	11 (12.8)
1–4 years	27 (31.4)
5–10 years	29 (33.7)
≥11 years	19 (22.1)
Sex	
Boys	36 (41.9)
Girls	50 (58.1)
Clinical sign or symptom*	
Vomiting	49 (57.0)
Diarrhoea	48 (55.8)
Abdominal pain	48 (55.8)
Fever	13 (15.1)
Loss of appetite	25 (29.1)
Loss of weight	6 (7.0)
Gas	5 (5.8)
Urticaria	3 (3.5)
Mean number of symptoms per patient	2.3

Note: *Not mutually exclusive, participants could be exposed to more than one.

Table 2 Care-seeking behaviour of the 86 mothers

Variable	No. (%) of the patients
Type of health care facility first visited	
General practitioner dispensary	30 (34.9)
Casualty department at a hospital	41 (47.7)
Casualty department at a polyclinic	14 (16.3)
Out-patient service in a paediatric hospital	1 (1.2)
No. of visits to health facility before correct diagnosis and treatment	
1	20 (23.3)
2	21 (24.4)
3	34 (39.5)
≥ 4	11 (12.8)
Faeces requested or duodenal fluid aspiration ordered at the first visit?	
Yes	40 (46.5)
No	46 (53.5)
Presentation at the hospital was encouraged by	
Nobody (self-motivated)	48 (55.8)
Family	19 (22.1)
Neighbours	5 (5.8)
Public health system	12 (14.0)
Location of residence	
In the same municipality	44 (51.2)
Surrounding municipalities	37 (43.0)
Other municipalities from the province	3 (3.5)
Out of Havana Province	2 (2.3)
Mode of travel to APHCH	
Vehicle	63 (73.3)
On foot	22 (25.6)
Bicycle	1 (1.2)

Table 3 Subsequent contacts for help in patients with giardiasis

	Number of patients	Number of visits to each place contact
Place of contact		
Casualty department at a hospital	20	23
Casualty department at polyclinic	14	14
General practitioner dispensary	18	18
Out-patient service in a paediatric hospital	2	2
Institute of Gastroenterology	1	1
Total	55	58

Table 4 Mothers' knowledge about giardiasis in relation of age, schooling history, employment status, and knowing others affected with giardiasis

	Mothers' knowledge about giardiasis		Crude odds ratio (95% CI)	P value	Adjusted odds ratio (95% CI)	P value
	Beliefs that giardiasis was the cause of illness before faecal or duodenal aspiration results	Only aware of diagnosis after results of faecal or duodenal aspiration examination				
No. of mothers	30	56				
Age (years)						
<30	10 (33.3%)	34 (60.7%)	3.09 (1.22–7.82)	0.02	2.2 (0.73–6.53)	0.165
≥ 30	20 (66.7%)	22 (39.3%)				
No. (%) of mothers with*						
No university	22 (73.3%)	51 (91.1%)	3.71 (1.09–12.61)	0.03	1.5 (0.38–6.14)	0.545
University	8 (26.7%)	5 (8.9%)				
No. (%) of mothers who*						
Knew other person with giardiasis	29 (96.7%)	25 (44.6%)	35.96 (4.57–282.68)	0.00	29.8 (3.71–239.4)	0.001
Work	20 (66.7%)	27 (48.2%)	2.15 (0.85–5.40)	0.10	...	...

Note: *Percentage of mothers within each knowledge category (i.e. believed that they had giardiasis before receiving faecal or duodenal aspiration or were only aware of diagnosis after results of faecal or duodenal aspiration examination).

1.09–12.61, $P=0.03$), and not knowing another person with giardiasis (OR: 35.96, 95% CI: 4.57–282.68, $P=0.00$) were significantly more frequent in mothers who were only aware of their children diagnosis of giardiasis at the time of the faecal smear or duodenal aspirate results compared with those who believed that they might have giardiasis before diagnosis was made. However, when these three ‘significant’ potential confounders were investigated in a multivariate analysis, the knowledge of other person with giardiasis remained the only significant variable (adjusted OR: 29.8, 95% CI: 3.71–239.4, $P=0.001$).

Diagnosis processes

Among the factors investigated, children age, attendance of mothers to university, the presence of diarrhoea, the presence of abdominal pain, type of health facility first visited, and the requesting of a faecal specimen or ordering duodenal aspiration during the first visit for microscopic examination, only the latter appeared associated with a correct diagnosis on the first or second visit to a health facility (OR: 3.84, 95% CI: 1.57–9.40, $P=0.003$) (Table 5).

Discussion

The median time between the onset of symptoms and the first time children were taken to receive the medical advice (2 days), compares favourably with those found in two recent studies: the first one carried out in Norway where, in the Bergen outbreak, it took an average of 17 days from onset of illness to the first physician contact.¹⁶ In the second study, carried out in Colorado and Minnesota, USA, the median

number of days from symptom onset to the first health care visit was 7 days (range: 0–37 days) in risk factors arm (where most case-patients had acute symptoms and were enrolled within 42 days of symptom onset) and 19 days (range: 1–240 days) in delayed enrolment arm (those enrolled after 42 days, where most case-patients had chronic symptoms).¹⁵ This shorter time could suggest a prioritization of gastrointestinal symptoms and signs, especially for younger children. In Cuba, the vast infrastructure of health facilities developed, has allowed to achieve a good density of service provision at all levels, including hospitals and health centres, so access to care does not appear to be a major problem. However, understanding what affects caregivers’ decision is essential, because timely evaluation of children with symptomatic giardiasis may contribute to the control of this disease.

The pattern of care-seeking behaviour was variable and, as it has been observed in the USA¹⁵ and Norway,¹⁶ there was a high rate of health care utilization. Almost the half per cent of children were taken to the casualty department at a hospital. Unfortunately, we did not document the reasons for choosing the first place of contact. Sixty-six children had more than one visit before the diagnosis of giardiasis was made; similar to the Norwegian outbreak.¹⁶ These visits were also targeted more towards casualty departments at hospitals, where patients with gastro-intestinal symptoms are usually treated with non-specific medications, including oral rehydration salts. Giardiasis may be a self-limiting infection and, even in the presence of persistent

Table 5 Results of the univariate analysis, showing the crude odds ratios (ORs) and their 95% confidence intervals (CIs), for a correct diagnosis of giardiasis within two visits to a health facility

Variable	No. of patients correctly diagnosed		Crude OR		
	After one or two visits	Only after at least three visits	Value	95% CI	<i>P</i>
Age (years)			1.23	0.53–2.90	0.63
<5	17	21			
≥5	24	24			
Schooling			1.94	0.58–6.50	0.28
No university	33	40			
University	8	5			
Diarrhoea			1.43	0.61–3.36	0.41
Yes	21	27			
No	20	18			
Abdominal pain			0.81	0.34–1.90	0.63
Yes	24	24			
No	17	21			
Type of health facility first visited			1.75	0.74–4.11	0.20
Primary level	18	26			
Secondary level	23	19			
Faecal requested or duodenal aspirated ordered in first visit			3.84	1.57–9.40	0.003
Yes	26	14			
No	15	31			

excretion of cysts, symptoms often abate and resolve, perhaps because of a reduction in numbers of trophozoites in the small intestine.²¹ Additionally, patients may improve because of the intermittent nature of symptoms of giardiasis.^{1,15,22} Therefore, patients with intermittent symptoms might delay seeking care, as it may be difficult to distinguish the spontaneous waning of symptoms from disease resolution. Whatever the reason, similar to the Norwegian outbreak,¹⁶ symptomatic improvement after some medical interventions may have contributed to a delay in diagnosis and aetiological treatment.

In this study, many patients presenting gastrointestinal symptoms were not investigated using faecal laboratory methods that could lead to the identification of an aetiological agent. A study in other country has shown a similar under-utilization of faecal examination by doctors.²³ In Cuba, microscopic faecal examination remains the mainstay of diagnostic proceeding for giardiasis and, due to its limitations,²⁴ it is recommended the examination of up to three faecal samples collected over alternative days.²⁵ Presumably, all health workers in Havana know this rule, but stricter adherence to it seems to be necessary. Alternatively, the diagnosis efforts for patients with gastrointestinal symptoms and suspected giardiasis were mainly concentrated on microscopy of duodenal aspirate, which has become the main diagnostic tool for it in APHCH. The role of this technique in the diagnosis of giardiasis is subject of controversy; some studies favour this technique;^{26,27} however, in others, the results are poor.²⁸ Although we have not got any evidence which supports the following hypothesis, one of the reasons why only small percentage of practitioners ordered faecal smear examination to a high proportion of cases reporting diarrhoea and vomiting at first consultation could have been that, according to their awareness, illness should have been caused by a viral gastroenteropathic pathogen^{29–32} and treated children accordingly, and also their failure to consider giardiasis, especially under the acute diarrhoeal disease context. As viral infections are most frequent, testing for protozoa is not routinely performed for patients with acute gastroenteritis, because it adds cost without substantially altering treatment.

There is no established an ‘acceptable’ period between onset of symptoms and commencement of treatment for giardiasis, so far. In fact, the clinical presentation of early symptomatic giardiasis is non-specific or may even be misleading, as many enteric pathogens and non-infectious gastrointestinal diseases produce similar symptoms.²² It is necessary the examination of at least three faecal samples collected over alternate days and in this way, several days often pass between the initial suspicion of giardiasis and the

final parasitological confirmation.²⁵ During this time, an untreated patient’s condition may improve or will worsen. In our study, the median time between the first presentation to a health unit till the start of treatment of giardiasis was 6 days. This duration was shorter than the in the 33 days observed in the study by Nygård *et al.*¹⁶ We think that the main reason for earlier diagnosis in our patients could be related to the age of children, the number of times they visited a health facility, and the endemic nature of giardiasis in Cuba. Anecdotal experience of the authors, as well as a qualitative study,³³ suggests that a large proportion of caregivers attending APHCH are unaware that symptoms of giardiasis may be mild and vary in severity.

When the awareness of *Giardia* infection among caregivers in Havana,^{33,34} its increased prevalence among children,^{3–9} and its occurrence within the community,² which may also be a cause of hospitalization,^{35,36} are considered, it is not surprising to find that children of mothers who knew other people with *Giardia* were diagnosed earlier. However, it seems that despite efforts at informing the public about intestinal parasites in Cuba, more information is necessary for addressing the giardiasis.

According to our survey, it seems to be critical to improve the detection and management of giardiasis at the patient’s first point of contact with the healthcare system. Therefore, it is crucial that the index of suspicion for this illness be raised among physicians. In Cuba, according to studies carried out by Fonte Galindo *et al.*,^{37–39} it has been evidenced that some physicians may benefit from further education regarding various aspects of giardiasis. This is something that has also been found elsewhere.^{40,41}

This study has several limitations that should be acknowledged. First, the number of *Giardia*-positive cases in the present study was a modest 86 cases. Second, patients were recruited from a single urban hospital in Havana, and the results may thus not apply to other settings; i.e. our data may not reflect the patterns of care in physicians’ offices. Third, as the information about the main events in care-seeking behaviour is self-reported, there were possibilities of recall bias regarding the onset date of first giardiasis-related symptoms. However, the short time between the diagnosis and the interview, the fact that questionnaire was pre-tested to make sure that all questions were understandable, and that interviewers tried to obtain information from different sources — including medical records review for consistency in reported date of symptom onset — could reduce the recall bias. Fourth, it must be noted that diagnosis may sometimes be delayed caused of caregivers’ attitudes and behaviours; for example, some patients asked to return for follow-up investigations might

have not complied, thus causing a longer time to obtain accurate diagnosis. Fifth, we did not search for other pathogens, which could be the cause of some of the clinical manifestations, i.e. viruses. Sixth, these data are more than 3 years old, and patterns of care-seeking and diagnosis processes may have evolved. Although no additional widespread public education efforts have been made in recent years.

Despite the previous limitation mentioned, we may conclude that this study offers important information to better manage giardiasis. Education on the clinical and public health aspects of giardiasis should be intensified and a comprehensive approach that focuses on increasing the awareness of giardiasis among caregivers and general population would be advisable. It is necessary that doctors should be more alert to the possibility of giardiasis in patients with gastrointestinal symptoms so that it can be diagnosed early and treated promptly to reduce patient morbidity, with consequent reductions in sequelae resulting from prolonged, untreated infections, as well as to limit the infection spread to the household and the community. The above measures may lead to a changed pattern in the diagnosis process, reducing both the time from onset of symptoms to sampling and the time from onset of symptoms to treatment.

Disclaimer Statements

Contributors AAE and PA were the main researchers of all aspects of the study from conception and design to the final analysis and preparation of the final manuscript. They are also the guarantor of the paper. YS, IA, PA, AAE, and MA collected the data. AAE made the first draft of the manuscript, while PA, YS, IA, and MA provided important feedback on the interpretation. All authors read and approved the final manuscript.

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