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BRIEF REPORT

Epidemiology of shigellosis with special reference to hospital distribution of Shigella strains in Tehran

Reza Ranjbar[1], Mohammad Mahdi Soltan Dallal[2], and Mohammad Reza Pourshafie[3]

1. Molecular Biology Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran.

2. Department of Pathobiology, School of Public Health and Institute of Public Health Research, Tehran University of Medical Science, Tehran, Iran.

3. Department of Microbiology, Institute Pasture of Iran, Tehran, Iran.

ABSTRACT

Background: Infection caused by *Shigella* species are an important cause of diarrheal disease, in both developing and developed countries. Shigellosis is one of the major causes of morbidity in children with diarrhea in Iran. Aim of this study, was to investigate the epidemiology of shigellosis with special reference to hospital distribution of *Shigella* strains in Tehran between December 2002 and November 2003.

Materials and methods: Enteritis cases admitted at the Children Medial Center and Mofid, Baqiyatallah, Millad and Firozabadi hospitals in Tehran, Iran were included in this study. Fecal specimens and rectal swabs were cultured and identified for *Shigella* species using standard microbiological techniques.

Results: One hundred and forty one, 102, 56 and 3 *Shigella* strains were isolated from patients admitted to Children's Hospital Medial Center, Mofid, Milad, and other hospitals respectively. *Shigella* was isolated frequently from children under 5 years of age, who were accounted for 55.7% of all isolates. About 39.7 % of all isolates came from patients aged 5-12 years, and 4.3% from patients aged over 12 years of age.

Conclusion: Shigellosis is one of the most important infectious diseases in Iran. Results of our research have revealed that *Shigella* is still one of the most important causes of diarrhea among children in Tehran, Iran. The prevention of *Shigella* infections in children is an essential approach to control of shigellosis in the country.

Keywords: *Shigella species, Epidemiology, Shigellosis*.
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INTRODUCTION

Diarrheal diseases are the most important health problems in developing countries. Amongst the different pathogens responsible for diarrhea, Shigella species (spp.) plays an important role in causing inflammatory diarrhea and dysentery (1).

Shigellosis, also known as bacillary dysentery, is caused by four Shigella spp. including S. dysenteria (serogroup A), S. flexneri (serogroup B), S.boydii (serogroup C), and S. sonnei (serogroup D). Shigellosis as a global human health problem is more severe than other forms of gastroenteritis. It is endemic throughout the world

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Reprint or Correspondence: Mohammad M Soltan-Dallal. Department of Pathobiology, School of Public Health and Institute of Public Health Research, Tehran University of Medical Sciences, Tehran, Iran.
E-mail: soltanda@sina.tums.ac.ir

and it is among the most common causes of bacterial diarrheal diseases. Globally, it is estimated that shigellosis causes about 1,100,000 deaths per year, two-thirds of the patients being children under 5 years of age (2). Shigella sonnei is the serogroup of Shigella most frequently responsible for sporadic and epidemic enteritis in developed countries, however in developing countries S. flexneri is the most dominant. Shigellosis is one of the major causes of morbidity in children with diarrhea in Iran. In two previous studies conducted in years 1984-85 and 2001-02, S. flexneri has been reported as the most prevalent species in Iran (1- 4). The current study was undertaken to investigate the epidemiology of shigellosis with special reference to hospital distribution of Shigella strains in Tehran, Iran.

PATIENTS and METHODS

In the years 2002 and 2003, diarrheal cases admitted at the Children Medial Center and Mofid hospital, two large pediatric hospitals, and also three additional large hospitals - Baqiyatallah, Millad and Firozabadi - in Tehran, Iran were included in this study. Three times or more watery, bloody or soft defaecations per 24 hours were considered as diarrhea. A standardized questionnaire was used for obtaining data of onset, symptoms, medical treatment, age, sex, travel history, and residence, filled in by hospital nurses. In some cases, patients or the patient's parent was interviewed.

Fecal specimens and rectal swabs collected from the patients were cultured on Shigella – Salmonella (SS), Hektoen- Enteric (HE), Xylose lysin deoxycholate (XLD), and MacConkey (MC) agars (Difco Laboratoriers, Detroit, Mich). Suspected colonies were picked after incubation for 24 hours at 35° C. Shigella spp. and were preliminarily identified by gram stain, colony morphology, lactose fermentation, motility, as well as by results of general biochemical tests (5). Strains were sero-grouped by using commercially-available antisera from MAST Group LTD (Mast House, Derby Road, Bootle, Merseyside , L201EA, UK).

RESULTS

The results obtained from hospital distribution of confirmed Shigella isolates showed that 141 strains were isolated from patients admitted to Children's Medial Center Hospital, 102, 56 and 3 strains were isolated from patients admitted to Mofid, Milad, and other hospitals respectively.

Median age of the patients was 5 years, with a range from 1 month to 12 years. Shigella was isolated frequently from children under 5 years of age, who accounted for 55.7% of all isolates. About 39.7 % of all isolates came from persons aged 5-12 years, and 4.3% from persons aged over 12 years of age.

Table 1. Hospital distribution of *Shigella* spp strains isolated in Tehran, 2002-3

	CMC*	Mofid	Milad	Others	Total
Winter 2002					
S.dysenteriae	0	0	0	0	0
S.boydii	1	0	1	0	2
S. flexneri	21	3	3	0	27
S. sonnei	1	0	2	0	3
Spring 2003					
S.dysenteriae	1	0	1	0	2
S.boydii	1	0	1	0	2
S. flexneri	23	3	1	0	27
S. sonnei	4	5	0	0	9
Summer 2003					
S.dysenteriae	0	0	0	0	0
S.boydii	1	3	0	0	4
S. flexneri	17	20	1	1	44
S. sonnei	52	44	30	1	127
Fall 2003					
S.dysenteriae	1	0	1	0	2
S.boydii	2	0	0	0	2
S. flexneri	4	7	1	0	12
S. sonnei	12	17	9	1	39
Total	141	102	56	3	302

* Children Medial Center

DISCUSSION

In recent years, the importance of Shigella as an enteric pathogen with the global impact has been increasingly recognized. Bacillary dysentery caused by this organism is particularly common in younger children living in endemic areas.

Shigella spp. is one of the major causes of diarrheal disease in Iran but reports regarding its prevalence are few. For many years, S. flexneri was considered as the predominant isolate in Iran (1, 3).

As shown in Table 1, the most strains of Shigella isolates belonged to S. sonnei. In a previous study conducted in Tehran during 1999-2001, Hosseini et al. also found S. sonnei as the prevalent Shigella species (6). More recently, Farshad et al. (2006) has also identified S. sonnei as the most prevalent Shigella species in Shiraz, Iran (7).

However in a previous study during March 1984 to August 1985 in Tehran, among 230 Shigella spp. strains, S. flexneri was the species most commonly found (61.2%) (3). Also in another study conducted during November 2001 to October 2002 in Tehran, among 123 Shigella isolates, S. flexneri (55 strains) was dominant followed by S. sonnei (38 strains) (1). Similar pattern of species prevalence has been reported in neighboring countries. S. flexneri, as the predominant species, accounted for 44.0%, 58.0%, and 65.0% of Shigella cases in Saudi Arabia (8), Pakistan (9) and Jordan (10), respectively.

The highest rate of infection was seen among the patients with 1 to 5 years old. The group of patients with the highest frequency of isolation of Shigella spp. in our study was younger compared to previous reports from Iran, where the group of 12 or more than 12 years of age had the highest frequency of isolation (1).

Results of our research have revealed that *Shigella* is still one of the most important causes of diarrhea among the Children in Tehran, Iran. The prevention of Shigella infections in children is an essential approach to control the mortality of shigellosis in the country.

We hope the results obtained from current study to be useful in epidemiological investigation of Shigella spp. in Iran.

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