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## Giardiasis in Saudi Arabia

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### Summary

A laboratory survey for *Giardia lamblia* (*G. intestinalis*) was conducted in five regions of the Kingdom of Saudi Arabia for the months of January through December 1980. Stool samples of 53,306 individuals from the northern, southern, eastern, western and central regions of the Kingdom were examined by wet films and zinc sulphate concentration methods. Five thousand two hundred seventy one (9.9%) stools were positive for *G. lamblia*. The prevalence of infection was higher in males (64%) than in females (36%). Mostly 5 to 13-year-old children were infected.

**Key words:** *Giardia lamblia*; giardiasis, incidence of infection; sanitary conditions; Saudi Arabia.

### Introduction

*Giardia lamblia*, a protozoan flagellate known to inhabit the duodenum of man, was first described by Leeuwenhoek, who demonstrated the organism in his own stool (Dobell, 1920).

The prevalence of giardiasis varies with the geographical locations and is higher in areas with warm climates (Nutter et al., 1941). Peterson (1972) reported that results of twenty-one surveys revealed a two to six percent prevalence of giardiasis in man. Giardiasis is more common in third world countries where lower hygienic conditions favor its spread (Meyer and Radulescu, 1979), and is more readily found in children (Roberts-Thompson et al., 1976).

A nationwide survey of five regions of Saudi Arabia was conducted and was designed to study some epidemiological characteristics of giardiasis.

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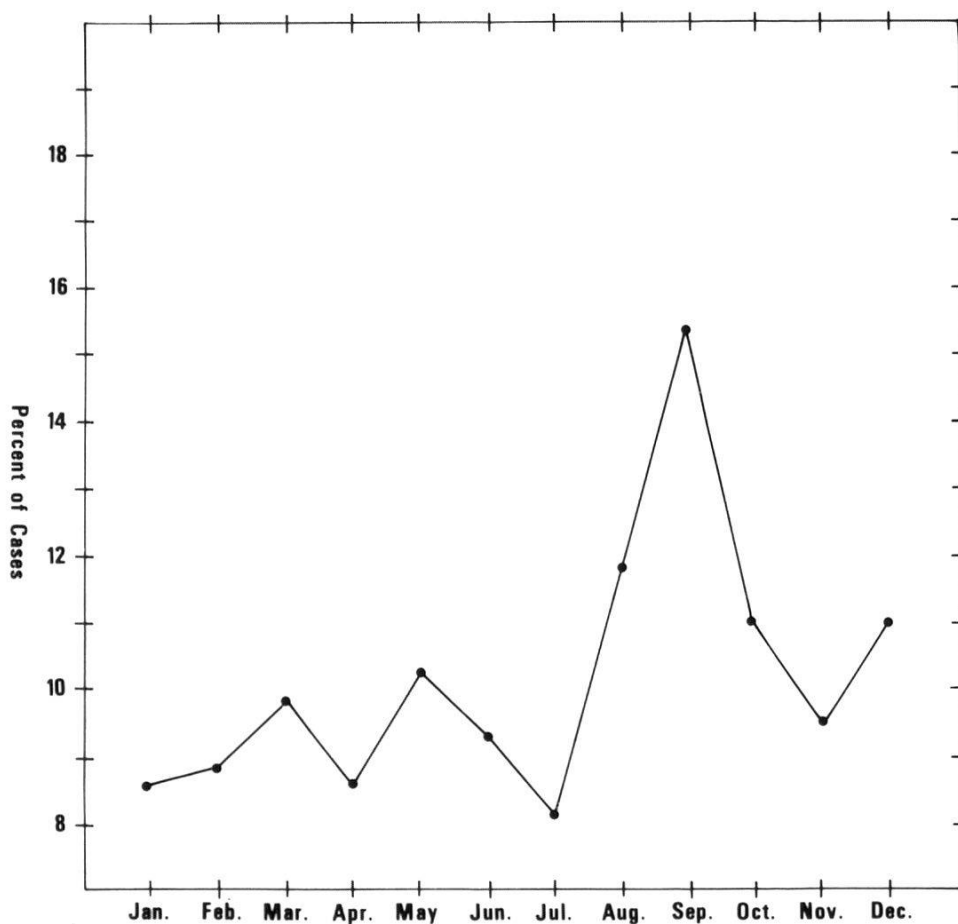


Fig. 1. 1980. Mean monthly percent of positive cases of giardiasis in Saudi Arabia.

## Materials and Methods

An epidemiologic survey was conducted in five regions of Saudi Arabia in the period of January through December 1980. During this period, stool specimens were randomly selected from individuals visiting major hospitals in each of the regions. A case of giardiasis was defined as any person having a positive stool specimen of *G. lamblia* during the study year. General information obtained from each participant in the survey included demographic factors (age, sex, nationality), clinical profile of illness, chronic diarrhea in family members and past history of giardiasis when possible. Fecal samples were examined by the zinc sulphate concentration method (Faust et al., 1938) and by direct film method (Brown, 1975). For stool sample examinations, physical facilities and technical assistance of major hospitals in each of the regions were used.

## Results

During the study year (1980), *G. lamblia* was identified in 5271 (9.9%) of 53,306 stools examined (Table 1). The highest incidence of infection was reported in the southern region of the country. The rate of infection was observed to be higher among males (64%) than among females (34%). Monthly variations of giardiasis are shown in Fig. 1. As indicated in Fig. 1, the highest percentage of positive cases of giardiasis occurred in the month of September. All stools positive for *G. lamblia* were those of children ranging from 5 to 13 years of age. The

Table 1. 1980. Regional distribution of *Giardia lamblia* in Saudi Arabia

Region	Total no. of individuals examined	Total no. of positive cases	Percent of positive cases	Percent of	
				males	females
Northern (Hayil) . . . . .	10,437	1399	13.4	65	35
Southern (Abha and Abu Areish) . . . . .	10,304	1420	13.8	61	39
Eastern (Dammam) . . . . .	6,573	141	2.2	60	40
Western (Jeddah) . . . . .	11,923	856	7.2	75	25
Central (Riyadh) . . . . .	14,069	1455	10.3	57	43
Total <sup>a</sup>	53,306	5271	9.9	64	36

illness experienced by most of those positive for *G. lamblia* was characteristic of giardiasis: abdominal cramps, diarrhea and weight loss.

Water samples from a number of drinking wells and streams in various regions of Saudi Arabia showed fecal contamination, but *G. lamblia* was not demonstrated in such samples.

## Discussion

*Giardia lamblia* can potentially be transmitted either by direct contact or such common vehicles as insects, food or water (Wright et al., 1977). In the present study, however, *G. lamblia* was not identified in such water samples. Wright et al. (1977) reported that seasonal distribution of fecal coliform was similar to the monthly distribution of *G. lamblia* cases.

The rate of infection of *G. lamblia* cases in Saudi Arabia is also attributed to inadequate sanitary and hygienic conditions. A large portion of the population in rural areas of Saudi Arabia resides in homes without proper indoor plumbing and such conditions prevailing to a great extent in the southern region of the nation may explain the higher rate of infection there, in comparison to other regions (Table 1). This is further exemplified by the relatively lower incidence of infections (2%) in the eastern region of Saudi Arabia where sanitary conditions are vastly improved.

Person-to-person transmission of *G. lamblia* may verify the high prevalence of the disease among children (Wright et al., 1977). The parasite is spread via the fecal-oral route (Brown, 1948) and due to play habits in feces infested areas, children are more likely to be exposed to the organism. Black et al. (1977) reported that one-year-old children who were mobile, but not toilet trained, had the highest *Giardia* infection rate. These investigators found that the rate of infection dropped in 2- and 3-year-old children, most of whom were toilet

trained and had better hygienic standards than the one-year-old group. Our survey shows that giardiasis in Saudi Arabia is most prevalent in 5 to 13-year-old children. Roberts-Thompson et al. (1976) demonstrated that the low incidence or lack of infection of *G. lamblia* among adults may reflect the resistance to subsequent infection acquired during childhood.

The population's staple diet, consisting of carbohydrate rich foods, may be a factor in the epidemiology of giardiasis in Saudi Arabia. Schneider (1961) reported that the rate of infection in mice fed protein as the only diet was lower than that in animals fed carbohydrate rich diet. Furthermore, glucose stimulates glycogen utilization and oxygen consumption in *Giardia* (Smith, 1978).

In the past five years, health care and sanitary facilities have been vastly improved in Saudi Arabia. The Saudi Ministry of Health is carrying out a public health awareness campaign aimed at improving personal hygiene standards throughout the Kingdom. This has been a factor in reducing the incidence of infection of *Giardia* and other etiologic agents whose epidemiology is correlated to sanitary conditions and personal hygiene.

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