

# Epidemic of amoebiasis and giardiasis in a biased population

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**SUMMARY** Of 126 homosexual men in a selected population in New York City, 31.7% were infected with *Entamoeba histolytica*, 18.3% with *Giardia lamblia*, and 39.7% with one or both on a single stool examination. Of 5885 clinic and hospital patients examined in the same laboratory by the same methods, 1.3% were infected with *E. histolytica*, 2.1% with *G. lamblia*, and 3.3% with one or both. Evidence indicates that an epidemic of intestinal protozoan infection exists in the homosexual male population in New York City. The difficulty in making a diagnosis, inadequate therapy, failure to alert potential victims, and official neglect of the epidemic have combined to create a dangerous situation.

## Introduction

The purpose of this paper is to establish, by a brief historical survey and evidence provided by a prospective study, that thousands of individuals in New York City are presently infected with *Entamoeba histolytica* or *Giardia lamblia* or both. The notion that an epidemic of amoebiasis and giardiasis exists in a large metropolitan area may seem incredible. Evidence has accumulated, however, indicating that part of the sexually active adult community in New York City is heavily infected with *E. histolytica* and *G. lamblia*. The first published report of the relationship between such protozoan infections and sexual behaviour was made by Most (1968). He described four cases of amoebiasis in homosexual men in New York City linked only by shared sexual experience. Some years previously, one of us (B.H.K.) had asked the New York City Department of Health to investigate the water supply in certain areas of Greenwich Village, because it seemed that more cases of amoebiasis came from that part of the city than from elsewhere. The water supply was found to be uncontaminated.

During the next decade, little attention was paid to the problem. A spate of articles then appeared suggesting that in New York City and elsewhere the incidence of amoebiasis and giardiasis in the sexually active homosexual population was high and

increasing. Kean (1976a), William *et al.* (1977), Kazal *et al.* (1976), Meyers *et al.* (1977), Sohn and Robilotti (1977), Schmerin *et al.* (1977), Mildvan *et al.* (1977a), Hurwitz and Owen (1978), and others reported on this association. Simultaneously, evidence accumulated that viruses—for example, hepatitis B, and bacterial pathogens, such as *Shigella* spp, *Salmonella* spp, and some helminths, such as *Enterobius vermicularis*—can be transmitted during sexual practices (Drusin *et al.*, 1976; Bader *et al.*, 1977; Dritz *et al.*, 1977; Mildvan *et al.*, 1977b). Frequent sexual exposure involving fellatio and anilingus with multiple partners is obviously the mechanism of transmission of enteric pathogens. Such a pattern of sexual activity occurs throughout the sexual spectrum in both homosexuals and heterosexuals but is probably more common among the former.

Our project was designed to determine how heavily infected with *E. histolytica*, *G. lamblia*, *Salmonella* spp, and *Shigella* spp sexually active homosexual men in New York City were, fully recognising that this group represented only a single, small segment of the homosexual and heterosexual populations at risk.

## Patients and methods

The study population consisted of volunteer patients presenting to the Gay Men's Health Project, which is primarily a screening facility for the detection of syphilis and gonorrhoea in sexually active homosexual men. The clinic is located in Greenwich Village and provides services to patients residing in

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greater metropolitan New York. The clinic population is predominantly young adult, college-educated, middle-class, white men. Most of the patients are very active sexually and present periodically to the clinic for routine screening for venereal disease.

All patients were informed of the nature of this study by printed information sheets and by direct counselling by the clinic staff and were invited to participate. Those with symptoms suggesting enteric disease were urged to participate.

Each patient was asked to bring a morning stool specimen to the parasitology laboratory of the New York Hospital-Cornell Medical Center. He was asked whether he had symptoms, whether he had ever had amoebiasis, giardiasis, or severe diarrhoeal illness, and whether he had taken any antibiotics or other drugs for the treatment of intestinal infection during the preceding three weeks. No patient was excluded from the study for any reason. A total of 126 patients participated.

Each specimen was examined microscopically both directly and, after concentration, by a modified Ritchie (1948) technique. The concentrate was stained with either iodine or merthiolate-iodine-formalin stain. Two-thirds of the specimens were cultured for protozoa using a standard culture (Cleveland and Collier, 1930). The first 63 specimens were cultured for *Salmonella* spp and *Shigella* spp in the microbiology laboratory of the New York Hospital-Cornell Medical Center by standard bacteriological techniques routinely used for the isolation and identification of these organisms. Two aliquots from each of the first 100 specimens were preserved in 6% formalin and MIF solution for future reference.

## Results

### CLINICAL

Approximately three-quarters of the patients reported gastrointestinal symptoms of some sort; almost always these were mild. Complaints included flatulence, cramp, diarrhoea, mucus or blood in the faeces, pain, constipation, fatigue, sweating, bleeding gums, upset stomach, and nausea. Six patients had recently taken antibiotics.

### PARASITOLOGICAL

Results of the faecal examinations are given in the Table. The results of 5885 consecutive stool examinations performed in the same laboratory by the same techniques and by the same technicians are given for comparison. This population, also biased, represented hospital inpatients and outpatients of the New York Hospital whose physicians considered a

Table Results of parasitological examination of stool specimens from two biased population groups

Protozoa isolated	Male homosexual community (1977)		Inpatients and outpatients of the New York Hospital (1976-77)	
	No.	%	No.	%
One or more	61	48.4	305	5.2
<i>Entamoeba histolytica</i>	39	31.7	74	1.3
<i>Giardia lamblia</i>	23	18.3	123	2.1
<i>Entamoeba coli</i>	15	11.9	82	1.4
<i>Endolimax nana</i>	19	15.1	84	1.4
<i>Iodamoeba butschlii</i>	4	3.2	13	0.2
<i>E. histolytica</i> and <i>G. lamblia</i>	12	9.5	5	0.08
<i>E. histolytica</i> or <i>G. lamblia</i> or both	50	39.7	192	3.3
Total no. of specimens	126		5885	

parasitological examination of the stool necessary for a number of different reasons.

Thirty-one (24.6%) patients had a previous diagnosis of amoebiasis and one of giardiasis. Of these 31 patients, 18 (58.1%) had negative results in this study: five were infected with *E. histolytica*, two with *Endolimax nana*; two with *E. coli*; one with *E. histolytica* and *E. coli*; one with *E. histolytica* and *G. lamblia*; one with *E. histolytica* and *E. nana* and one with *G. lamblia*. Thus, since 58% of these previously infected patients had negative results compared with 51.6% of all the patients in the study, and compared with 49.5% of the patients with no previous history, this group did not artificially increase the 'yield' of our study.

### BACTERIOLOGICAL

Two of the first 63 (3.2%) specimens gave positive results for *Shigella*: one for *S. sonnei* and one for *S. flexneri* type 3. No *Salmonella* spp were cultured.

## Discussion

Sawitz and Faust (1942) pointed out many years ago that a single stool examination yields only a small percentage of the positive diagnoses that would be made if five stools from the same individuals were examined. Their figures (Sawitz and Faust, 1942) suggested that only one-third of potentially positive results were found on one stool examination. Our own experience indicates that in the presence of symptoms that figure may be low. If the stools were examined as soon as they were passed or if a saline cathartic had been used and several specimens were examined in sequence, the figure of 39% for one or more protozoan pathogens certainly would have been higher. Thus, the figure of 39% could be increased easily to at least 50% and possibly to 65% with a

more intensive coprological study of the same individuals. We will assume, therefore, that at least half of our study group was infected.

The study group represented a biased population. These results must not be extended to the entire homosexual population, to the heterosexual population, or to other communities. Nevertheless, cautious interpretation of the data leads to some interesting conclusions. New York City has a population of about eight million people. The population at risk for venereal amoebiasis and giardiasis is a sub-group of the adult population who engage in oral/anal sexual contact and have numerous sexual partners. One large segment of this population has been identified as New York City's homosexual male community (Schmerin *et al.*, 1978), but the total size of this community is unknown. We do know, however, that 10% of men are more or less exclusively homosexual during the three years between the ages of 16 and 35, and 4% of white men are exclusively homosexual throughout their adult lives (Kinsey *et al.*, 1948). New York City has more than 75 homosexual bars and bath-houses (*Gay Yellow Pages*, 1979) suggesting a minimum supporting population of more than 75 000. The 10 000 or more clients of the Gay Men's Health Project would, therefore, represent only a small proportion of the city's total sexually active homosexual male community (10 000 has been the mean annual attendance between 1972 and 1978).

If about 50% of our biased population was infected with amoebiasis or giardiasis, how many of New York City's population are also infected? There are too many variables and too many assumptions to allow a statistical estimate, but several non-scientific mathematical manipulations suggest numbers ranging from 10 000 to 50 000. Many of those infected escape detection at treatment centres. Large numbers remain asymptomatic. Similarly, few of the asymptomatic cyst carriers are detected because of the difficulty of accurate diagnosis. All of these untreated cases add to the expanding reservoir of infection, allowing further transmission from person to person.

Coprology remains a neglected science. The proper examination of the stool is requested by few physicians and accomplished by fewer laboratories. The accurate diagnosis of *E. histolytica* infection demands careful microscopical study by an expert, the use of special concentration methods, staining, and culture. It is expensive and time-consuming. Leucocytes are mistaken for *E. histolytica* even by experts who adopt cultural and staining methods that are rarely used routinely. Krogstad *et al.* (1978) emphasised the incidence of overdiagnosis (false-positive results) and underdiagnosis (false-negative

results), and discussed in detail the problems of accurate diagnosis.

Our knowledge of amoebiasis and giardiasis has been increased recently by the reports of Krogstad *et al.* (1978) and Wolfe (1978) respectively. Although about six drugs are being used for the treatment of intestinal amoebiasis, there is no unanimity regarding either the preparation or the dosage (Kean, 1976b).

#### RECOMMENDATIONS

The public health authorities—federal, state, and city—who have so far shown only token interest in this subject must intervene. A newsletter from the Commissioner of Health to practising physicians (*Sexually Transmitted Diseases Newsletter*, 1977) and the mild intellectual interest of the infectious disease divisions of government agencies is hardly adequate to meet the needs. When, in 1933, following the World's Fair, an epidemic of amoebiasis occurred which affected 1500 people with several deaths in different parts of the country, the United States Public Health Service mobilised a team, engaged special consultants, alerted all health departments, and acted in a responsible manner (Bundesen *et al.*, 1933; McCoy, 1936). The epidemic in New York City is vastly greater in numbers and in potential for disaster. What the situation is in other cities, with the exceptions of San Francisco and Seattle, is not known.

Clearly, there is a serious need for a national assessment of this problem. The scope of sexually acquired enteric protozoan infection must be fully defined; only then can resources be intelligently allocated for the educational, diagnostic, and treatment facilities necessary to control and perhaps eliminate these 'newest' of old diseases.

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