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PREFACE

The International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) is an autonomous, international, philanthropic and non-profit centre for research, education and training as well as clinical service. The Centre is derived from the Cholera Research Laboratory (CRL). The activities of the institution are to undertake and promote study, research and dissemination of knowledge in diarrhoeal diseases and directly related subjects of nutrition and fertility with a view to develop improved methods of health care and for the prevention and control of diarrhoeal diseases and improvement of public health programmes with special relevance to developing countries. ICDDR,B issues two types of papers: scientific reports and working papers which demonstrate the type of research activity currently in progress at ICDDR,B. The views expressed in these papers are those of authors and do not necessarily represent views of International Centre for Diarrhoeal Disease Research, Bangladesh. They should not be quoted without the permission of the authors.

ABSTRACT

In an outbreak of food poisoning investigated in March 1980, 10 of 11 members of a family who ate a food called jalar jao experienced acute gastroenteritis within 4 to 12 hours. All 10 patients were hospitalized at the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) field hospital at Matlab. *Salmonella java* was isolated from rectal swabs from 4 patients. The technique of preparation and the history of eating the jalar jao, the short interval between eating and the onset of the illness, and the culture results suggest that the jalar jao was the vehicle. Jalar jao, which is traditionally eaten cold by rural people during hot summer months, may be an important vehicle for transmitting pathogenic organisms.

INTRODUCTION

Among the bacterial causes of food poisoning, *Salmonella* is recognized as one of the most common enteric pathogens in developed nations and numerous reports of *Salmonella* food poisoning have been published (1-4). Estimations of its occurrence and significance in developing countries, particularly in Bangladesh have been limited.

In the Matlab Field Hospital of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), 6,000-8,000 patients from a surveillance area of 260,000 persons are treated for diarrhoea annually. *Salmonella* is a rare cause of diarrhoea in these patients (Blaser MJ, Hug I: unpublished data). During the past 18 years, we have documented only one outbreak of *Salmonella* food poisoning. We report here the results of an investigation of that outbreak.

MATERIALS AND METHODS

The Outbreak: Ten of 11 members of a family from a village under Matlab Police Station, Comilla district, were admitted to the ICDDR,B Matlab Field Hospital at 7 p.m. on March 4, 1980, with histories of diarrhoea, vomiting, fever, abdominal pain, and lethargy; most appeared toxic. All of the patients had eaten a locally made food called jalar jao the previous afternoon; the symptoms had started within a few hours of eating the food.

Epidemiologic Investigation: A team went to the house of the family to collect epidemiologic information. The affected family consisted of 11 members, including the head of the household, his wife,

3 sons, 5 daughters, and the wife of the eldest son. Eight other persons lived in the bari (compound) but did not share food with the subject family.

When the family returned from the hospital rectal swab specimens were taken for culture from all 11 members of the family and from two chickens. Environmental samples of water from the handpump tube-well, and river, and food samples were taken for culture. Samples of the jalar jao could not be taken as it had already been destroyed. Rectal swabs from 24 chickens from 5 other families were taken as controls. All the samples taken were cultured for *Salmonella* using standard procedures (5).

The Procedure for Preparation of Jalar Jao: Unhusked paddy rice was soaked in water for 2-3 days. When the rice germinated, it was dried in the sun without boiling, then husked by the indigenous method on the ground. A small portion of the husked rice was made into rice powder. The rest of the rice was boiled, and then the rice powder was added. When thus prepared, the food became thick and soft in consistency. After preparation, this mixture was kept in earthen pots partially covered with banana leaves for 2-3 days, then mixed with molasses and coconut, and eaten.

RESULTS

Clinical Course: The ages of the patients ranged from 4 to 60 years (mean age 21). The mean duration between eating the jalar jao and the onset of symptoms was 8.3 hours (range 4-12 hours). Diarrhoea and vomiting began simultaneously in 8 of the 10 patients. All patients experienced severe abdominal pain from the onset, and had temperatures ranging from 101.8°F to 103°F. Eight patients had mild dehydration, and two were moderately dehydrated when they were

admitted to the hospital. All 10 were toxic-appearing and lethargic. Routine hospital treatment was started with oral ampicillin and oral and/or intravenous rehydration solution as indicated. Within 44 to 60 hours in the hospital, the diarrhoea stopped, temperatures returned to normal, and the abdominal pain remitted. All had recovered by the 4th hospital day and were discharged, although some continued to be lethargic.

Epidemiologic Investigation: The family blamed their illness on jalar jao that they ate between 3:00 p.m. and 4:00 p.m. on March 3, 1980. The food had been prepared on March 2 and was kept in 3 earthen pots. The family stated that all but one of them had eaten a large handful of the food. All family members who ate the food became ill while a daughter who had not eaten the food remained well ($p=.09$, Fisher's exact test). The illnesses began 4 to 12 hours after the meal; when they became more severe all family members reported to the hospital on March 4, 1980.

In the week before illness, the family had eaten mostly rice with curry of pumpkin and beans. The curry was prepared each evening and eaten hot. Leftovers were kept overnight, reheated, and eaten the next morning. The daughter who did not eat the jalar jao ate the usual rice and curry. None of the family members had diarrhoea in the preceding week, and none of them had visited other places or received visitors.

Laboratory Findings: *Salmonella java* was isolated from a rectal swab taken from the only patient cultured at the hospital. *Salmonella java* was isolated from 3 other family members during the follow-up cultures and from 1 of the 2 chickens of the affected family. No *Salmonella* or other pathogenic bacteria were isolated from water or food samples or from the chickens of the neighbouring families.

DISCUSSION

This study has several limitations. First, because we could not culture the jalar jao, we could not prove that this food was the vehicle. Second, we did not culture all the patients when they were admitted to the hospital; culturing was done after they had received antibiotic therapy. However, the food histories, the technique of preparing the food, and the epidemiologic investigation suggest that the jalar jao was responsible for this outbreak of *Salmonella* food poisoning. Heated rice with unboiled rice powder, molasses, and coconut could serve as a good culture medium for bacterial growth. The uncooked rice powder that had been dried on the ground may have been the source of the contamination. Alternatively, incompletely covered with banana leaves may have allowed outside contamination such as from the chickens. Eating the food without heating may have increased the chance of infection. The short interval between eating and the onset of illness and the 100% attack rate for those who ate the food suggested that a high dose was present. The chicken from the affected family was positive with the same *Salmonella* serotype as that of the patients, suggesting that contamination of the food could have been from the chicken. The chicken may also have been infected by eating the jalar jao, although this is less likely. That chickens are usually not carriers of *Salmonella* in Bangladesh is indicated by the negative cultures of the control chickens from other families.

Salmonella food poisoning in Bangladesh is unusual in part because food is usually cooked well and eaten hot. The jalar jao, partially cooked and eaten cold, could be an important vehicle for spread of *Salmonella* and other bacterial infections in rural communities.

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