STUDY OF URBAN CHOLERA EPIDEMIC OF DACCA 1974 AND 1975

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Introduction:

A great change of Vibrio cholerae from Classical Inaba to El Tor Ogawa took place from 1970 through 1973 in Bangladesh. Following the war of liberation in 1971 the social and political setting underwent significant changes leading to poverty and overcrowding. The cholera epidemic of 1974 was very special for it was the first major El Tor Epidemic in Dacca and it was the largest epidemic of cholera ever recorded in Dacca. It commenced six weeks earlier than usual and began during unprecedented flooding in the city. The flood destroyed the standing crops and the people flocked to the city for government assistance and jobs. The accommodations available for these people were unsatisfactory and the refugees constructed thousands of huts near the markets, railway stations, on the borders of the city, industrial parks and on the unused government land. There was no arrangement made for waste disposal. Some agencies sank hand pump tubewells which provided in-sufficient quantities of drinking water. People used available ditches, ponds, canals and rivers for bathing, washing and cooking. In many bustees they washed, bathed and swam in the same tanks which were directly contaminated with nightsoil from latrines situated right on the banks. In many other places the submerged and dry city roads were contaminated by nightsoil either leaking from sewerage pipe or from the service latrines during the period of rain and flood. During the previous years there were epidemics of cholera in the city of Dacca almost as an annual phenomenon. In the overall setting of a depressed economy, poor sanitation and an increased urban population a large increase in the number of cases of cholera and shigellosis were observed. These factors afforded opportunity to study the factors associated with increased rates of cholera occurring in the city.

In an analysis of data from the 1974 epidemic we found that people eating outside of the home contacted cholera more commonly than those who do not eat outside. During 1975 we collected additional information on type of food eaten outside home by cases and age and sex matched non-cholera controls. In 1975 there was no flood and many bustees on government land were demolished, but the bustees maintained on private land persisted and became more crowded due to increased demand by the up-rooted people. The non-local refugee camps were not demolished from the city areas. Compared to 1974 a greater number of cholera cases continued to occur in the city during the early months of 1975. The occurrence of an unusual number of cases during the early months of the year alarmed both the CRL and the government of Bangladesh. In this situation, we assisted the government in attempting to control the anticipated epidemic.

One method under considerations was to explore ways to control the epidemic by visiting the families, distributing water sterilising tablets and supplying prophylactic Tetracycline to all members of the families for one day. Tetracycline was supplied to the contacts on the basis of the findings of Dr. McCormack and others who found that it was a useful prophylaxis.

Materials and Methods:

The population of the six police stations in Dacca Municipality was 556,712 in the 1961 census. This increased to 1,310,975 during the 1974 census and the population of greater Dacca (including Gulshan, Mirpur and Narayanganj) grew to 1,659,219. The population density was 46,800 persons per square mile in the Dacca Municipality. Though the number of treatment centers remained the same in Dacca, the CRL served a wider area than greater Dacca and continued to be the principal center for treatment of diarrhea. Admission records of cholera cases were reviewed for the period from 1970-75 to provide trends of changes during the period.

During the peak of the 1974 epidemic 613 randomly chosen cholera cases were interviewed within a few hours of their arrival to CRL ward to identify sources of water, sanitary facilities, history of eating out, duration of residence, effect of flood, monthly income, number of members in the family, number of rooms in the home and other medical facilities used prior to admission. The same data were collected from 203 control families matched for similar age, sex, occupation, income and socioeconomic status from neighborhood of cholera cases. In some cases attendants of the cases helped to identifying the residences of the index. The controls were interviewed in thier residences and cholera cases were interviewed in the hospital. In the cases of minor, or unconscious cases questionnaires were administered to parents or attendants.

In 1975 there were some additions in the methodology. A few persons were engaged round the clock to obtain correct addresses of all cases occurring within the six police stations of Dacca Municipality. The controls were selected from the neighborhood of cases as for 1974 matching for age, sex, socioeconomic condition and ethnic group. Both the cases and controls were interviewed in their own homes. We included a separate questionniare for obtaining the detailed history of types of food and drink taken outside home. We cultured some enviornmental swabs. CRL teams visited families located in the municipal area only. To help the government-CRL program an early diagnosis was made to facilitate visit at the earliest possible time. The government staff could not visit all the families in many instances either for poor addresses or for insufficient number of workers.

During 1975 similar data were collected from randomly chosen 168 cases and 168 controls and in addition a detailed history of eating out queried about which particular food items eaten was taken. A history of diarrhea

occurring within 5 days in contacts were also obtained from all the groups for both years. In addition, 54 food samples and 57 water samples were collected from the restaurants, roadside shops and also from diarrhea affected families within 10 hour from the onset of acute diarrhea during the peak of epidemic in 1975.

During epidemic the government was adopting all means to put an end of the epidemic. One of such means was a government-CRL venture to visit the affected families and distribute tetracycline capsules and water sterilizing tablets among the contacts of cholera cases. Initially, water (jar) disinfectant and one day's dose of tetracycline were supplied to the contacts of 265 cases by government and CRL personnel. History of diarrhea occurring in the last week and hospital admissions from the families were collected. A second visit was made to collect same data from these families between 10-14 days after the first visit. The index families who were not visited by the government or CRL personnel initially and who did not receive tetracycline or water sterilizing tablets were visited between 10-14 days later and similar histories were obtained. This second group was listed as control cases for evaluation of anti-epidemic drive. The interviews and visits were conducted by experienced CRL field workers and the records were checked by the supervisors. The cases from the Municipal area of Dacca only were interviewed for the purpose of CRL study. Some cases beyond the city limits were visited by government personnel.

Results:

Table 1 shows the gradual changes of Vibrio cholerae from Classical Inaba to Classical Ogawa and then to El Tor Ogawa during the years from 1970 through 1973. During 1974 El Tor Inaba strain appeared again and by 1975 it exceeded the Ogawa strain once again in the urban areas of Dacca (spot map).

Table 2 shows the seasonal incidence of cholera by months. In 1974 the epidemic continued from August to December having its peak in October when 48.3% of cases occurred. In 1975 for the first time there was no end of the previous Spring epidemic and again it peaked in October when 39.63% of cases occurred. In both the years the epidemic commenced much earlier than the previous epidemics.

Figure 1 shows the number of cases by weeks for the two year. Table three shows the cholera attack rate by police stations in Dacca Municipality. In 1974 the rates varied from 1.36 to 2.10 per 1000. The Tejgaon police station had been divided into 3 police stations, creating two new police stations, Guishan and Mirpur. Some of the residents of new police stations may consider themselves that they are still residents of the Tejgaon police station and therefore this rate may be artificially high. However, the combined rate for these 3 police stations was 1.28/1000 for the last six months of 1974. The next highest rate was in Sutrapur police station which is a combination of the lowest and lower middle class people. During the epidemic from July to December the rate was higher for Ramna police station which was a fascinating mix of elegant upper class residents and the lower class refugees in 1974. In 1975 a similar pattern was

observed in all areas except in Ramna where the rate was 0.88/1000 following the removal of large numbers of slum dwellers.

The table 4 gives the population, sanitation facilities and the attack rates for cholera admissions in the three refugee camps which were established in 1972. Camp A located in Mohammadpur police station was the largest accommodating non-local refugees. It had a modest provision of sanitation and an attack rate of 1.6 per 1000 was observed. Camp B and C located in Ramna police station accommodating local refugees had very little facilities for water and no provision for waste disposal. In these camps remarkably higher attack rates of 3.9 and 4.3 per 1000 were noted. The socioeconomic conditions of the residents of all these camps were very low and the camps were similar except with respect to the water supply and waste disposal facilities.

The next table (5) gives the duration of residence in Dacca of cholera cases and controls in 1974. It shows that 77% of all cases stayed in the city over 1 year and 10% less than 3 months. This is almost similar for both cases and controls.

Table 6 shows the effect of flood on index and control families. It shows that the effect of flood was similar for both the groups affecting approximately 30% of those interviewed in both case and control groups. But the rate of shifting of residence due to flood was higher in cholera index families.

The next table (7) shows the water-use pattern of index and control families. It shows that usage of drinking water in urban areas were almost similar in all income groups both among the cases and controls. Almost all the people claimed that they used either tap or tubewell water for drinking. In the lowest income group 66% to 68% of the reported sources of bathing and washing water were either tap or handpump tubewells. In the upper group over 70% of the cases and over 80% of the controls claimed to use either tap or tubewell water for bathing and washing. There was no difference between the usages of cases and controls of the same income group.

Table 8 shows the latrine-use pattern of cases and control families. There was no difference in the use of latrine between cases and controls. But with the increase in income the trend of using sanitary latrine was noted in both the groups of cases and controls. In the lowest group 20% families used sanitary or closed latrine, in the middle group 29% and in the highest income groups 55% families used sanitary latrines. This pattern has been observed during both the years of study.

Table 9 gives the number of diarrhea which occurred within the past 5 days of interviews among the contacts of both cases and controls. During both 1974 and 1975 there were great differences in the rates of diarrhea in case and controls families. The number of episodes of diarrhea per family among the contacts of cases was 1.05 and in controls

was 0.40 during 1974 and it was 0.42 and 0.12 respectively in 1975. From the index families 69 cases were hospitalized for treatment in 1974, but there were none from the controls. In 1975, 24 cases were treated in hospital from index families as against 3 from control families. The overall hospitalization rate of diarrhea cases from index families was 32.7% and 2.97% from control families.

Table 10 shows the eating out places of cases and controls. In all 304 persons ate out during the two years of study. Out of these 15.1% of cases and 13.1% of controls ate in ordinary restaurants, 10.8% of cases and 1.0% controls ate at charitable meals, 27.9% cases and 19.4% controls ate from roadside hawkers' shops. Cases ate out more frequently from all types of eating places.

Table 11 shows the number of cases and controls by age who took meals outside home. In 1974 81 cases and 18 controls out of 203 patients took meals outside home. During 1975 study period 113 cases and 92 controls out of 168 patients took meal outside. Adults of both groups took meals more frequently outside. In 1975 there was much higher rate of eating out. The differences were significant in all groups except for the 0-4 year age group.

In 1975 we incorporated in the questionnaire the types of food eaten out. Table 12 shows the food preference list - collected from the cases and controls who ate outside home. Frequency of taking water was common for both cases and control though cases took more than control. Bread (loaf), dalpuri (fried bread with pulse), beef curry, watered rice and khitchuri (rice boiled with pulse) were more commonly used by cases than controls.

Table 13 shows the rate of diarrhea and hospitalization of the contacts of tetracycline-treated and untreated groups. In the treated group the diarrhea attack rate was 13.53% and in the untreated group it was 14.4%. Of all the diarrheas in the treated group 32.9% required hospital treatment where as in the non-treated group 55.2% needed hospital treatment.

Discussion:

Although the classical serotype of Vibrio cholerae disappeared earlier from other countries, it was present in considerable number in Dacca until 1971. During 1972 there were only a few hundred classical cases of cholera detected in Dacca and by 1973 the classical cholera completely disappeared from the urban areas of Dacca. The classical cholera was seasonal in urban areas, but since the change to El Tor the strict pattern of seasonality appears to be minimized though the peaks of epidemics were still in the vicinity of those of the classical peaks. Occurrence of two consecutive major epidemics in the urban areas as had been seen during the last two years, was rarely observed previously during the period of classical cholera in Dacca. Though other workers had reported localisation of classical cholera epidemic to small communi-

ties in urban areas of Dacca, this pattern was not seen in case of El Tor cholera in the same city. The cholera cases of both the years 1974 and 1975 were very evenly distributed throughout the city. Thana attack rates were calculated on the basis of the national population census data for each police station. Even though the rate of Tejgaon topped the list, it may be attributed to an artifect in that this police station had been divided into 3 and many people still erronously mentioned Tejgaon as their place of residence. Tejgaon is also the nearest Thana to the CRL. The combined rate for all these 3 police stations however, was 1.28/1000 during 1974. This is true for 1975 too. Although thousands of people stayed in relief camps and homeless refugee colonies (Bastuhara) located in Mohammadpur police station the attack rate was lowest 1.35 per 1000 in the entire Municipal area.

Interesting data was developed from Ramna police station where there were essentially two classes of residents -- distinctly upper class residents and clearly lower class refugees during 1974. Perhaps because of these two widely different social classes staying in this police station the overall attack rate by thana was similar in 1974. But the rate in 1975 was 0.88/1000 compared to 1.75 of 1974. This difference was probably due to the fact that most of the bustees on government land of this police station had been demolished during early 1975. In Dhanmondi and in the elegant areas of Ramna there was practically no cholera during the last two years of ever greatest epidemics but there were many cases in the refugee camps located there. We have recorded very few cholera cases in the government housing areas of Azimpur whereas the government housing areas of Peelkhana and Hazaribag had many cases. Similarly less densely populated areas of Mohammadpur Thana which are more completely covered with adequate sanitary facilities had a lower rate of cholera than other police stations in 1974. It is not only the location but also the class of people which appear to have great influence in the occurrence of cholera. In Sutrapur police station the population remained the same and the highest rate of cholera was observed in this police station in both the years. The data obtained from the 3 refugee camps show great difference in the rates where rates of 1.6, 3.9 and 4.3 per thousand were observed. The recognisable difference between them was in the provision of water and waste disposal facilities.

An analysis of cases by location in the Dacca Municipal area revealed no stricking differentials with regards to time of occurrence. Despite certain differences the epidemic began peaked and ended simultaneously in each section of the city during both the years. This is distinctly unlike the pattern of urban classical cholera observed by Martin and others.

During the flood and epidemic of 1974 there were tremendously increased number of homeless people in the city, and it had been suggested the transient nature of the population was a factor in the large epidemic. We observed that 10% of the people interviewed had been in their residence for 3 months or less whereas 77% lived here a year or more and no differences

were noted between cases and controls. During the next year there was no flood and the number of transients were fewer, but the second largest urban epidemic was recorded. We conclude that the flood and resulting large floating population had little influence on the increased number of cases.

The rate of diarrhea per family occurring within 5 days prior to interview was higher in case families than control families. Another striking feature was the rate of hospitalisation of diarrhea cases occurring in contacts of cases and controls. When 32.7% of all diarrheas from the index families had to be hospitalized in 1974 and 1975 2.97% of diarrheas from control families sought this treatment in 1974 and 1975.

All types of eating places were availed by both cases and controls. During 1974 frequent charitable meals were supplied by voluntary agencies, and the government also operated charitable feeding stations in the city. During both the years cases used outside food establishments more than the controls. Although both cases and controls reported eating out more in 1975. This is probably due to a change in the method by which the data were obtained. We assume that asking a detailed list of foodstuff enhances the recall of eating out.

The data on taking food outside were very interesting and highly significant in all groups of age and sex except for the group 0-4 years of ages. The data were most striking in case of elder group of cases. It is customary for everyone in this country to consume at least a glass of water after every meal or snack. People doing physical work also required more water. It was not possible to ascertain whether food or water was related with higher incidence during 1974 epidemic.

During the next year of study (1975) the detailed history of food and drink consumed outside by cases and controls were incorporated and samples of food were cultured. In the past we could isolate vibrio from left over food from an outbreak at Rayer Bazar but none of the samples of food in the 1975 outbreak were positive. A greater number of samples of food may be needed to pin point a positive source as it is very difficult to have left over food from the affected families who may be anxious to conceal their fault. Seven samples of water out of 57 collected from the jars of affected houses, restaurants and also directly from the source turned to be positive for Vibrio cholerae. Fifteen percent of the contacts were found to be positive for Vibrio cholerae by a single swab.

If we look to the food preference list we find that water was consumed outside by a maximum number of people. The next common item was bread (loaf) which are usually prepared at night and sold in the following morning and sometimes 2-3 days following preparation. Bread is eaten without further preparation by the poor people, but in general is seldom implicated in transmission of diarrhea. None of the food items were especially popular among the cases or controls.

In evaluating the control measure the dose used to prevent further cases in index families by both the CRL and government staffs was inadequate as demonstrated by MacCormack et al. In many cases contacts may not have received even one day's dose. The sterilisation of water, which was limited to one small, available earthen jar or enamel cooking pot, was inadequate. Another drawback in the prevention program was the two to three days delay in finding index families. In other studies of family outbreaks the majority of cases detected subsequent to the "index" case occur in this interval. Thus we missed the opportunity to prevent cases during the time when they were expected to be most prevalent. Therefore it is not surprising that the rate of diarrhea was not different between the case and control families. Nevertheless a possible advantage of even prophylactically inadequate tetracycline treatment was that of all the diarrhea cases occurring in treated families 33% required hospitalization in comparison to 54% from the non-treated families. We have not ruled-out that in a situation with prompt reporting of cases and early visiting of families to give the recommended 5 days of tetracycline prevention of the spread cholera in urban areas may be useful.

It has been seen that people do not care much for diarrhea until and unless there is a death from diarrhea. The severe cases are usually brought or referred to the CRL. The majority of mild cases are either treated locally or not treated at all. We do not know how many sub-acute or mild cases or inapparent infection occur for one severe case during a pure El Tor epidemic. So the proportion of diarrhea cases of the city treated by the CRL is not known. Though clustering of classical cholera had been observed by other workers during the last two years of study. We observed almost uniform distribution of El Tor cholera cases among the susceptible group of people. Further confirmation is required to see the exact extent of clustering and the social and geographic units associated with it. For a logical control measure these information are needed for planning urban cholera epidemic.

TABLE I

URBAN CHOLERA STUDY, 1974 AND 1975

Number of Cholera Admissions to CRL, Dacca
by Calendar Year, Serotype, and Biotype

Year	Classical Inaba	Classical Ogawa	El Tor Inaba	El Tor Ogawa	Total
1970	2,792	38	-	138	2,968
1971	1,042	1,426	-	185	2,653
1972	40	598	1	63	702
1973	1		10	1,265	1,276
1974	-	2	853	4,662	5,517
1975	-	-	1,834	1,536	3,370

TABLE 2

URBAN CHOLERA EPIDEMIC, 1974 AND 1975

Monthly Incidence of Cholera by Year

Months Year		January	February	March	April	May	June	July	August	September	October	November	December	Total
1974	No.	5	-	1	20	9	10	22	129	588	1114	369	38	2305
	%	0.22	-	0.04	0.87	0.39	0.43	0.95	5.60	25.51	48.33	16.01	1.65	100.00
1975	No.	6	8	8	32	45	98	67	139	354	648	185	45	1635
	%	0.37	0.49	0.49	1.96	2.75	5.99	4.10	8.50	21.65	39.63	11.31	2.75	99.99

TABLE 3

URBAN CHOLERA EPIDEMIC 1974 AND 1975 (DACCA)

Cases and Rates of Cholera by Police Station

Police Station	Population	Cholera Admission		Rate per 1000	
		1974	1975	1974	1975
Kotwali	159275	261	214	1.63	1.34
Sutrapur	218938	420	417	1.91	1.90
Lalbag	247494	396	344	1.60	1.39
Ramna	268363	471	235	1.75	0.88
Tejgaon	218103	459	440	2.10	2.02
Mohammadpur	217134	296	176	1.36	0.81
Total	1,329307	2303	1826	1.73	1.37

FIGURE 1

URBAN CHOLERA STUDY, 1974 AND 1975
Cholera Admission in CRL Ward by Week

1974
1975
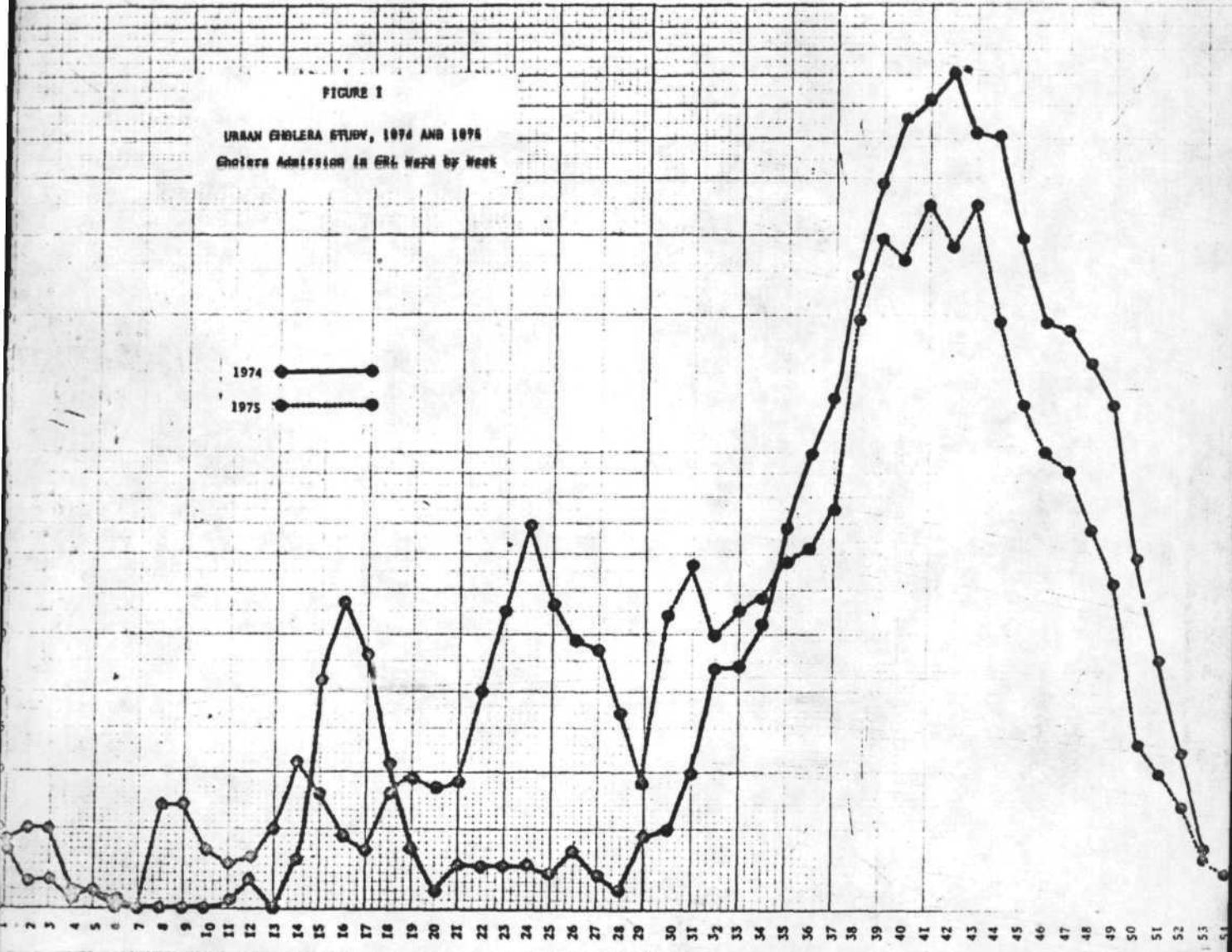
TABLE 4

URBAN CHOLERA STUDY, 1974

Cholera Rates, Water & Sanitary Facilities of Bustees and Camps

Bustees/Camp	Population	No. of Cases	Attack Rate/ 1000	No. of Tap/ Tubewell	No. of Pond/ Tank	Percent Use un-safe Water for W/B	No. of Sanitary Latrine	No. of Open Surface Latrine	Percent Use Un-sanitary Latrine
A									
Geneva Camp (New Relief)	49,675	80	1.61	75	-	-	382	-	-
B									
Kamalapur Rly. Station Bustees	11,375	45	3.95	6	2	100%	-	35	100%
C									
Kataban Babupara Bustees	12,112	52	4.29	6	4	100%	-	30	100%
Total	73,162	117	2.41	87	6		382	65	

TABLE 5

URBAN CHOLERA, 1974
Duration of Stay & Incidence of Cholera

Interview Groups	Duration			Total
	0-3 m	3-12 m	12 m+	
Cholera	64	74	475	613
Percent	(10,4)	(12,1)	(77,4)	(99,9)
Control	12	39	152	203
Percent	(5,9)	(19,2)	(74,8)	(99,9)

TABLE 6

URBAN CHOLERA STUDY, 1974

Affect of Flood on Index and Control Families

Interview Group	No. of Family	Flood Affected	Rate Affected/ 100	Residence Shifted	Rate Shifted/ 100	Person/ Room
Cholera Families	613	179	29.2	55	30.7	4.4
Control	203	65	32.0	14	21.5	4.5

TABLE 7

URBAN CHOLERA EPIDEMIC, 1974 AND 1975

Sources of Water for Domestic Use of Cases and Control Families by Income

Monthly Income	Year Study	Sources of Water	Cases			Controls		
			Drink	Bathe	Wash	Drink	Bathe	Wash
Upto	1974	Tap/T.Well	153	93	94	156	88	90
		Other/Open	1	61	60	5	73	71
Tk.400	1975	Tap/T.Well	130	95	100	130	95	100
		Other/Open	-	35	30	-	35	30
Tk.401-	1974	Tap/T.Well	40	31	31	31	18	18
		Other/Open	1	10	10	-	13	13
800	1975	Tap/T.Well	28	22	22	28	22	22
		Other/Open	-	6	6	-	6	6
Tk.800+	1974	Tap/T.Well	8	3	3	11	8	8
		Other/Open	-	5	5	-	3	3
	1975	Tap/T.Well	10	10	9	10	10	9
		Other/Open	-	-	1	-	-	1

TABLE 8

-URBAN CHOLERA EPIDEMIC 1974 AND 1975

Usage of Latrine by Cases and Controls by Income

Income		Cases			Control		
	Year	Sanitary Latrine	Open Latrine	Total	Sanitary Latrine	Open Latrine	Total
0-400	1974	19	135	154	18	140	158
	1975	38	93	131	38	93	131
401-800	1974	15	26	41	4	29	33
	1975	5	22	27	4	23	27
800+	1974	3	5	8	5	7	12
	1975	7	3	10	7	3	10

TABLE 9

URBAN CHOLERA EPIDEMIC 1974 AND 1975

Diarrhea Among Family Contacts of Cases and Controls

	No. of Families	Total No. of Diarrhea Cases	Diarrhea Cases Per 100 Families	No. of Hospitalized Cases	Hospitalized Cases Per 100 Families
1974 cases	203	214	105	69	34
Controls	203	81	40	0	0
1975 cases	168	70	42	24	14
Controls	168	20	12	3	2

TABLE 10

URBAN CHOLERA STUDY, 1974 AND 1975

Eating Out Places of Cases and Controls

Name of Eating Places	Cases Ate Out			Controls Ate Out			Percent Cases Ate	Percent Control Ate
	1974	1975	Total	1974	1975	Total		
Ordinary Restaurants	10	36	46	0	37	37	15.1	12.1
Charitable Meals	29	4	33	1	2	3	10.8	0.99
Roadside Hawkers	29	56	85	14	45	59	27.9	19.4
Relatives' Houses	-	17	17	--	8	8	5,6	2.6
Family with Cholera/Diarrhea	13	-	13	3	-	3	4.2	0.99
Total	81	113	194	18	92	110	63.6	36.1

TABLE 11

URBAN CHOLERA STUDY, 1974 AND 1975

History of Eating Out by Cases and Controls Within 5 Days of Illness/Interview

| Age | 1974 | | | |
| | Cases | | Controls | |
	Ate Out	Did Not Eat Out	Ate Out	Did Not Eat Out
0-4	13	28	8	39
5-9	18	21	5	38
10-14	11	16	1	19
15 & 15+	39	57	4	89
Total	81	122	18	185

| Age | 1975 | | | |
| | Cases | | Controls | |
	Age Out	Did Not Eat Out	Ate Out	Did Not Eat Out
0-4	9	2	5	8
5-9	27	14	28	47
10-14	22	12	15	29
15 & 15+	55	27	44	84
Total	113	55	92	168

URBAN CHOLERA EPIDEMIC 1975 (DACCA)

Food Items Consumed Outside House by Cases and Controls

CASES				CONTROLS			
Food	No.	Food	No.	Food	No.	Food	No.
Rice	15	Halua	9	Rice	16	Halua	9
Chapati	18	Sweet	10	Chapati	16	Sweet	8
Loaf	28	Luchhi	1	Loaf	16	Luchhi	-
Puri	2	Mutton curry	7	Puri	-	Mutton curry	9
Dalpuri	23	Cut Fruit	8	Dalpuri	16	Cut Fruit	6
Water Rice	6	Pitha	1	Water Rice	2	Pitha	1
Khichuri	5	Fried Veg.	5	Khichuri	-	Fried Veg.	11
Fish Curry	16	Cooked Veg.	3	Fish Curry	15	Cooked Veg.	2
Sarbat	2	Semai	2	Sarbat	1	Semai	1
Molasses	30	Dal Chana	1	Molasses	26	Dal Chana	1
Ice Cream	28	Milk	1	Ice Cream	25	Milk	-
Water	55	Firni	2	Water	37	Firni	2
Pan with chun	15	Dal Musur	16	Pan with chun	16'	Dal Musur	15
Matha	3	Beef curry	7	Matha	1	Beef curry	-
Birani	4			Birani	2		

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TABLE 13

URBAN CHOLERA STUDY, 1975

Effect of Control Measures

	No.of Families	No.of Members	No.of Diarrhea	Rate of Diarrhea	No.of Hospita-lized	Rate Hospita-lized
Families Treated	265	1817	246	13.5	81	32.9
Families not treated	145	930	134	14.4	74	55.2