

ROLE OF LEARNED BEHAVIOR IN THE TRANSMISSION OF CHOLERA .*

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Learned behavior preserves the experience of social structure. For an understanding of the social structure, the goal of a particular society must be identified. Such a goal is the sum of the interaction of needs, ideas and aspirations. The pattern of learned behavior is determined by the society. It contains the practical experiences of a human being gained as a member of the society in which he or she lives. The individual's thoughts and actions are guided by the group in which he or she is a member. This paper will be concerned with a few relevant aspects of the learned behavior of social and hygienic customs which may play an important role in the transmission of cholera and other diarrheal diseases. A study was undertaken in two villages to elucidate patterns of such learned behavior with regard to personal hygiene which might be associated with the acquisition and spread of cholera and other diarrheal diseases. A proposal for intervention of the spread of cholera due to learned behavior factors will be made here. In this paper retrospective data will be presented to offer a framework for discussion and future plans.

One of the two study villages is an agricultural Muslim village and the other is a Hindu fishing village. In the two study villages children from 4 to 10 years age group and the parents of these children were interviewed in an effort to isolate the learned behavior factors which might be responsible for the transmission of cholera vibrios from one person to another. The age classification of children under study was known through registration of births and as a result it was possible to isolate the social and hygienic customs prevalent in each particular age group. Data on the learned behavior among children included toilet practices, feeding practices, and group or individual activities done in the learning period according to age and sex. Information on the social and hygienic customs of parents followed particularly in connection with children are analysed.

Retrospective data was collected according to age and sex from cholera positive cases who came from 132 villages of our vaccine trial area to the Matlab cholera hospital

during 1966 to 1970. Learned behavior will be reviewed in light of higher cholera attack rates in children and child-bearing age group of women.

Methods

For Table I in calculating the incidence rate of cholera in the vaccine trial villages the adjusted mid-year population of 1967 - 1968 was used.

Considering religious and professional affiliations one Muslim agricultural community and a Hindu fishing community were selected to gather field data for the proposed research. The children from age 4 to 10 years and the parents of such children were interviewed by trained field workers under the direct supervision of the senior investigator in an effort to isolate and identify learned behavior factors. The persons who were interviewed were selected on the basis of availability and willingness to participate readily in the interview on a first come first serve basis. In the tabulation of social and hygienic factors data on the children between 4 to 6 years of age group were not included since social and hygienic factors of taking a child in the lap and serving food were present in only a few and the remaining factors narrated in Table II were totally absent in them.

Results

Table I shows the age-specific incidence of bacteriologically proven cholera cases during the period of 1966 to 1970 in the Matlab vaccine trial area by sex. All suspected cholera cases who reported to Matlab cholera hospital during the period under consideration and found positive were included as cases. The rates of cholera point out two distinct aspects. Firstly, it was a disease heavily prevalent among the children below 15 years without any special leaning to any particular sex category. Secondly, the incidence of cholera was almost double among the females of age 15 to 39 years when compared with that of the males of the same age group. This age group represents the child bearing age of women in rural Bangladesh. Social and hygienic factors present among the children and mothers might be a contributory factor for higher incidence of cholera.

Figure I shows the similar trend of a higher attack rate of cholera among the children of both sexes. It also illustrates the striking difference between the incidence of cholera in males and females of the reproductive age group.

Table II shows the social and hygienic customs reported in 1975 by the parents and children in an agricultural village of 505 families and a fishing village of 332 families. In Table II information on 479 parents and 170 children have been recorded.

In cleaning others after defecation there was little difference in the participation of mothers in the two communities under study, the fathers and the boys had almost double participation in the agricultural community compared with the fishing one. On the other hand the girls registered higher participation in the fishing community. In bathing others the mothers of both the communities and almost equal participation. In this job the fathers had higher participation in the agricultural community. Both the boys and girls had considerably higher participation in bathing others. In drying the wet body of others, the mothers of the agricultural village had higher participation, whereas, the fathers had almost equal participation in this function. The boys had a considerably higher participation in the agricultural village in drying others. The participation of girls in this job almost doubled in the fishing village. The mothers in the agricultural village had more participation in washing stool-soiled cloth, and the fathers had higher participation in the fishing village in this regard. In washing stool-soiled cloth, the male children had almost equal participation, whereas, the participation of girls was more than double in the fishing community. Participation of mothers in taking a child in the lap was little higher in the agricultural community, the father's participation was significantly higher in the same community. The boys had a lower participation and the girls had a higher participation in this function in the agricultural community. Both the parents had slightly lower participation in the agricultural community in serving food. In serving food the boys had slightly lower participation in the agricultural community, for the girls this trend was found to be reverse. In summing up the findings of Table II it must be said that the fathers had significantly less participation

and the mothers had significantly higher participation in the stated social and hygienic functions. In almost all the functions the boys expressed lesser interest compared with the performances of the girls. This trend indicates the future role of boys like their fathers. We found no significant difference between these behavioral patterns of the two communities, although they were 10 miles apart and there were differences of religion and occupation.

Discussion

The high attack rate of cholera below 15 years of age irrespective of sex differentiation and the high attack rate among the women of child bearing age may relate to social and hygienic habits. Regardless of whether biological or cultural aspects predominate, there are no sex specific differentials in cholera rates that are noted in the older children although there are sex specific differences in hygienic role playing. When the child grows the social and hygienic factors gradually assume more and more importance since the child not only learns to take care of itself but sometimes is made responsible to take care of others. With the attainment of motherhood the extent of such responsibility reaches the peak. Marriage is almost universal in Bangladesh and most of the women become mother between the ages 15 to 19 years when the attack rate of cholera among adult females is found to be highest. The higher incidence of cholera among mothers may be increased because of their closeness to children who make the highest attack rate of cholera. The women of this reproductive age group who remain entrusted for the daily care of children have double the rate of cholera compared with the males of same age.

In a prospective Bari study by Dr. George Curlin in 1974 it was found that adult women had 50% more cholera incidence rate than their male counterpart.

The exposure to the environment for both males and females is same, but the difference in the attack rate of males and females point out the possibility of the influence of learned behavior in the attack rate, despite the similar antibody levels in both males and females.

The movement of females are mostly confined to the respective neighborhood compound; whereas, the males have outdoor duties beyond the limits of respective neighborhood and thus they have a chance to take meals and water outside in addition to the home meals and sharing of certain water sources around the neighborhood. Such different exposure to the environment on the part of males probably was not a contributory factor in increasing the number of cases among males in any significant measure. The stated significant difference between male and female attack rate might be an occupational hazard of motherhood.

After cleaning others with water following defecation, both the mother and the children do not remain conscious of adequate hand washing. They are not aware that the improperly washed hands are frequently used to touch food stuffs, both liquid and solid, and the hands may be contaminated with cholera vibrios when they clean children with water following defecation. There are clear chances that such children who are cleaned by the mother or other children may carry cholera vibrios in a suspected or unsuspected way. The mothers usually do not consider the stool of children and adults similarly and remain prepared to handle it without proper hygienic precautions. An intervention program to stop the transmission of vibrios may be worthwhile.

Almost three fourths of the children between 7 to 10 years were assisted by their respective mothers during daily bathing. During such assistance the mother herself takes her bath with the child and thus comes into close contact with the children who belong to the highest risk group of cholera. The children of the 7 to 10 years age group tend to remain for a longer period in water to learn swimming. It was observed in the two villages that most of the children of both sexes have learned swimming by the age of 10 years. The frequent attachment with water might be favorable for acquisition of cholera by the children.

Conclusion

After the wash following defecation the hand needs to be washed properly to eliminate the possibility of contamination with cholera vibrios. To stop the transmission of cholera vibrios from improperly washed hand to other contacts it is

proposed that after washing the hand following defecation everyone should dip the relevant hand in a disinfectant solution strong enough to kill the cholera vibrios. We suggest laboratory experiments be undertaken to develop an effective, cheap, and acceptable material to be used in handwashing so intervention studies can be undertaken:

In Bangladesh folk learned behavior is progressing toward a more fruitful society without destroying the roots of the older folk learned behavior. If an easy method is suggested to intervene the transmission of Cholera due to social factors, the villagers may be willing to practice the same. This study on learned behavior factors is a preliminary one. It is hoped that this would stimulate the need to quantify such factors so that required intervention studies can be undertaken. Intervention studies might be useful where the index case is identified so that the whole neighborhood of the index case may participate in the proposed intervention program. A set of randomly selected neighborhoods may be used for the proposed intervention studies.

TABLE I.

AGE SPECIFIC INCIDENCE OF CHOLERA OBSERVED
DURING THE PERIOD 1966-1970 IN MATLAB
VACCINE TRIAL AREA BY SEX

Age	Male Rate/ 1000	Female Rate/ 1000	Total Rate/ 1000
0-4	26.86 (9754)	21.85 (9513)	24.39 (19267)
5-9	13.29 (10988)	9.59 (10424)	11.49 (21412)
10-14	5.49 (8386)	6.10 (7212)	5.77 (15598)
15-19	6.96 (4308)	13.18 (4020)	9.97 (8328)
20-24	7.30 (3015)	12.15 (4610)	10.23 (7625)
25-29	2.47 (3240)	8.14 (4668)	5.82 (7908)
30-34	3.86 (3368)	5.70 (3858)	4.84 (7226)
35-39	3.66 (3278)	6.02 (2823)	4.75 (6101)
40-44	6.86 (2769)	3.83 (2349)	5.47 (5118)
45-49	4.14 (2174)	4.22 (1657)	4.18 (3831)
50+	4.23 (6848)	2.45 (5299)	3.46 (12147)

Figures in the parenthesis indicate the population in that group.

FIG. 1 : Age-Sex Specific Attack Rate for the Period 1966-1970 in Matlab V. T. S.

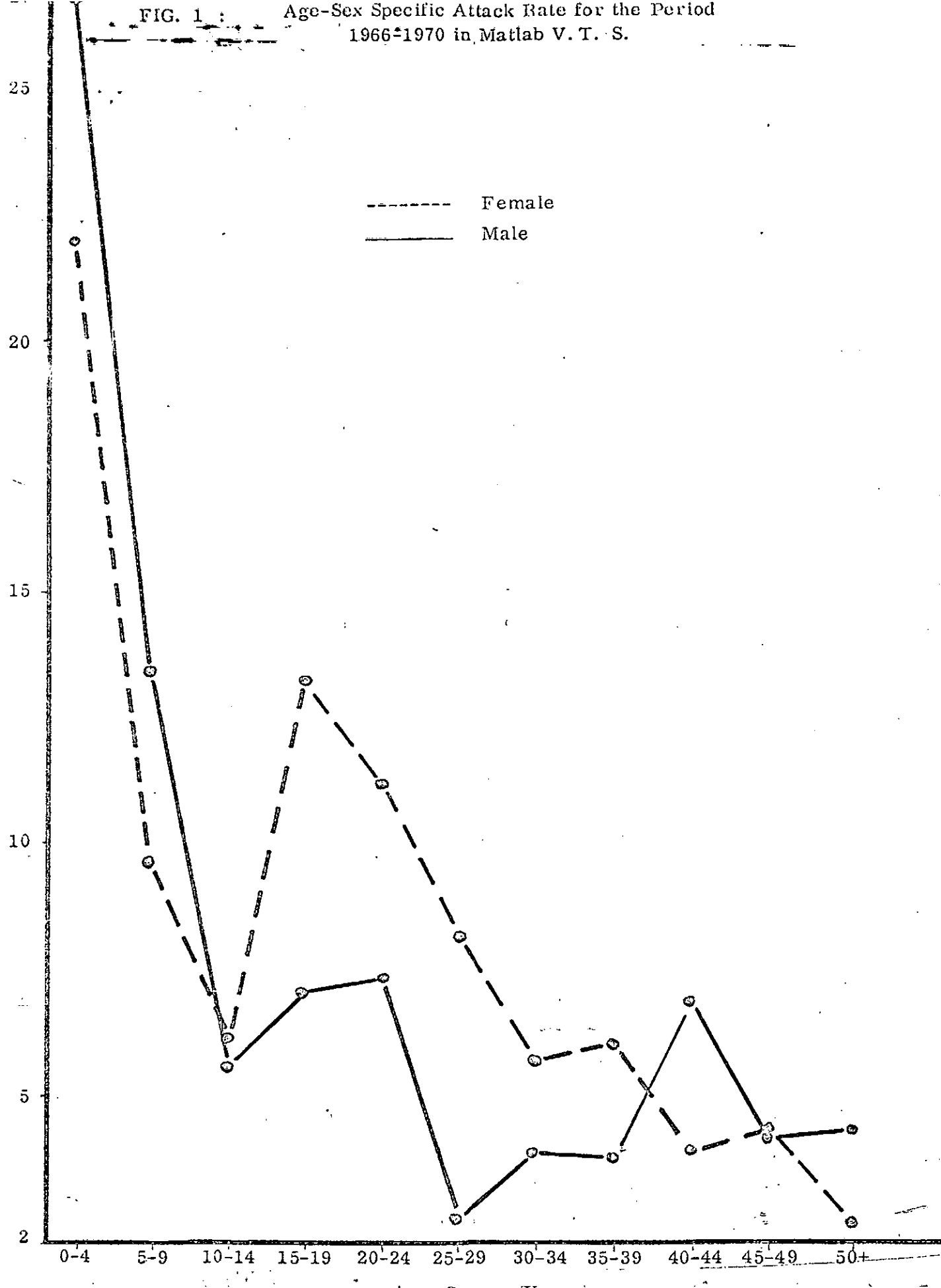


TABLE II

SOCIAL AND HYGIENIC CUSTOMS REPORTED IN 1975 BY PARENTS AND CHILDREN IN TWO VILLAGES AT MATLAB

Village Code	Type of Individuals Interviewed	Number of Interviews	Clean Others After Defecation %	Bathe Others %	Dry Others When Wet %	Washes Stool Soiled Cloth %	Takes Child in Lap %	Serves Food %
*C	Mother	134	58.95	71.64	67.91	53.73	61.94	67.16
C	Father	102	8.82	21.56	12.74	4.90	34.31	8.82
C	Boys between 7 to 10 yrs.	39	17.94	15.38	20.51	5.12	56.41	30.76
C	Girls between 7 to 10 yrs.	38	26.31	28.94	26.31	7.89	78.94	34.21
*VBII	Mother	161	58.38	74.53	55.90	44.72	54.65	70.80
VBII	Father	82	4.87	14.63	13.40	6.09	18.29	9.75
VBII	Boys between 7 to 10 yrs.	42	7.14	9.52	14.28	4.76	66.66	35.71
VBII	Girls between 7 to 10 yrs.	51	29.41	21.56	45.09	17.64	72.54	33.33

* C Indicates an agricultural village

* VBII Indicates a fishing village

PROCEEDINGS OF THE 9TH MEETING OF THE SCIENTIFIC
REVIEW AND TECHNICAL ADVISORY COMMITTEE OF
THE CHOLERA RESEARCH LABORATORY

and

REPORTS OF THE COLLABORATIVE STUDIES BETWEEN CENTER
FOR MEDICAL RESEARCH AND CHOLERA RESEARCH
LABORATORY

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