

Molecular Analysis of *Shigella dysenteriae* Type 1 Strains by Using Pulsed-Field Gel Electrophoresis

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Objective: Determine the use of pulsed-field gel electrophoresis (PFGE) in molecular typing of *Shigella dysenteriae* type 1 strains from sporadic outbreaks and epidemic periods from different geographical location of the world.

Methodology: Genomic DNA of *S. dysenteriae* type 1 strains was analyzed using PFGE. The use of PFGE in a Not-I-digested DNA fragments clearly distinguished isolates involved in the epidemic from the non-epidemic strains. Genomic DNA was digested by Not-I restriction enzyme and the fragments separated using the contour-clamped homogenous electric field method on a CHEF-DRII system on 1% agarose.

Results: One hundred thirteen isolates of *S. dysenteriae* type 1 (18 from epidemic and 95 from sporadic outbreaks) were typed by the PFGE method. These isolates were classified into 8 PFGE type A to H, comprising 1 to 22 patterns, and 25 patterns were identified in total. The major groups consisted of A and B. Type A was predominantly detected (in 51 of 56 strains) among the strains isolated in Bangladesh, while type B was rare (in 2 of 56 strains) and isolated only from Rangpur during the epidemic period in 1984. Among the very recent isolates (1995-1997) in Bangladesh, there were no type A pattern 2 isolates. This pattern was present among the epidemic strains isolated in Rangpur and in the Hooghly district of West Bengal, in 1984.

Conclusion: The results of the analysis suggest that a clonal relationship existed between these strains during the epidemic period in Bangladesh and West Bengal in 1984. Thus, the PFGE technique could be used as an epidemiologic tool for identifying epidemic-associated strains as well as for molecular subtyping of epidemiologically unrelated strains.

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Clonal Groups of Enteropathogenic *Escherichia coli* Isolated in Case-Control Studies on Diarrhoea in Bangladesh

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Objective: Investigate the clonal status of enteropathogenic *Escherichia coli* (EPEC) strains isolated from case-control studies in Bangladesh.

Methodology: Eighty EPEC isolates from children with diarrhoea and 14 isolates from matched healthy controls from two case-control studies were analyzed. The first study, conducted during 1991-1992, comprised 451 children aged up to five years with diarrhoea and 602 matched control children without diarrhoea. The second study, conducted during 1993-1994, comprised 546 children with diarrhoea and 215 matched healthy children recruited from the same neighbourhood. The EPEC isolates were characterized by serogrouping, enterobacterial repetitive intergenic consensus (ERIC) sequence PCR, and biochemical fingerprinting method (the automated phene plate or PhP system).

Results: Twelve EPEC serogroups were found with O114 (n=19) and O127 (n=23) being the dominant serogroups. Most strains of O114 serogroup belonged to the same PhP and PCR types. Strains of O127 serogroup contained those producing cytotoxin distending toxin CDT (n=16) and those which did not (n=7). Both were found among the patients and the controls. The results of PCR and PhP typing showed that the CDT-positive strains belonged to the same clonal group and were related to one of the two PhP/PCR types of CDT-negative O127 strains. Thirty-one

O-non-typable EPEC strains and 21 strains of other less prevalent serogroups belonged to diverse Ph/PCR types. Furthermore, they did not show any similarity to the strains of the two major serogroups: O114 and O127.

Conclusion: Recent case-control studies in Bangladesh showed a high prevalence of EPEC strains associated with childhood diarrhoea. The results of the present study suggest that single clonal groups of EPEC strains belonging to serogroup O114 and O127 are predominantly associated with childhood diarrhoea in Bangladesh.

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Economic Benefits of Diabetes Control in Bangladesh

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Objective: Estimate the direct medical-care costs associated with diabetes, and indicate how the medical-care costs increased with the progression of the disease from the initial stage.

Methodology: This study was based on the data derived from the "Guidebook" of diabetic patients registered at the BIRDEM hospital. The sample consists of the registered patients in the hospital since December 1985. The surveillance collected two types of information: baseline information on patient's demographic characteristics and follow-up information of revisits later on. The baseline data also report health-related information at the first visit. The follow-up data include height, weight, blood pressure, blood sugar level, treatment recommended, and complications observed for patients. Using the blood sugar level cut-off points, the severity of diabetes was defined for the patients, and all patients were grouped into three severity categories. The use of medical services by different categories of diabetic patients was compared to estimate the effect of increased blood sugar levels on the medical-care costs. An attempt was also made to identify the costs not related to diabetes to estimate the economic benefits of preventing the disease.

Results: Although the prevalence of diabetes is low in Bangladesh, it is already the 10th most expensive disease in terms of total healthcare cost allocated for an illness. Diabetes imposes significant additional costs on individuals, and the cost of diabetes tends to increase with time since onset. The severity of diabetes is also associated with increased direct medical-care cost implying that even a modest control of diabetes reduces the direct medical cost for patients.

Conclusion: The cost of diabetes is likely to increase at a rapid rate in the future due to its expected higher prevalence and the increased cost of medical interventions. An early diagnosis and control should significantly lower the future costs of medical care associated with diabetes. The Bangladesh health sector should consider the incorporation of diabetes screening as an important public health intervention. However, the degree of financial subsidy needed for this purpose should be determined by carefully examining its prevalence rate among the different socioeconomic groups.

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