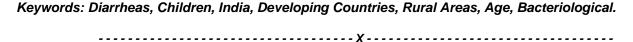# A Study of Bacteriological Diarrhea in Children

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Abstract – Diarrheas are one among the commonest causes of morbidity and mortality in children in developing countries like India. Children below the age group of 5 years in rural areas and of low socio-economic status are most commonly affected due to various reasons like unprotected water supply, poor personal hygiene, illiteracy and malnutrition. Male children were affected more than female children and the commonest age group involved was 0-5 years. Incidence was common in rural population and in low-socioeconomic group. Escherichia coli was the commonest isolate with an incidence rate of 54% followed by Klebsiella (17%), Pseudomonas, Salmonella(1% each) and mixed infection with Escherichia coli and Klebsiella(6%). Most of the isolates were sensitive to Ciprofloxacin, Norfloxacin and Gentamycin. On follow-up, recovery rate was 95% and mortality rate was observed to be 5%. The isolate and the antibiotic sensitivity pattern help the pediatrician in treating children with complaints of diarrhea.

Keywords: Diarrheas, Children, India, Developing Countries, Rural Areas, Age, Bacteriological.

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INTRODUCTION

Diarrhea Disease is caused by multi-pathogens and multi-factors. Whatever diseases that cause diarrhea clinically are defined as Diarrhea Disease before pathogen is ascertained in the conference of Diagnosis and Treatment of India Diarrhea Disease. It is classified as infectious diarrhea and noninfectious diarrhea. Diarrhea Disease is widespread all over the world, not only threatens human health but also greatly affects society and economy. The fatality rate by Diarrhea Disease highly ranks fourth among all the diseases, only lower than tumor, Cardiovascular or Cerebral vessels diseases and diabetes mellitus, things are worse in developing countries and low income countries, and it has become one of problems of the global major public health (Uppal, et. al., 2015). In creating nations like India, bowel issues are one of the commonest reasons for dismalness and mortality among kids (Daniel, et. al., 2005). The occurrence and mortality is high in Rural territories and unfortunate regions of Urban ranges chiefly because of destitution, lack of education, awful individual cleanliness, absence of wellbeing training and different elements. Around 1.5 million kids under the age gathering of five years bite the dust each year inferable from intense looseness of the bowels. Diarrheal ailments cause an overwhelming monetary weight on wellbeing assets, as youngsters with such maladies involve around 15% of Pediatric beds in some creating nations (Haricharan, et. al., 2013).

A person underneath 12 yrs of age was considered as a kid for the examination. A youngster endures on a normal 10 to 15 scenes of looseness of the bowels and of these, three to five happen in the initial five years of life. A youngster with various scenes of loose bowels experiences most serious type of protein vitality unhealthiness. Around 5% of looseness of the bowels cases in the group wind up plainly constant and last more than 2 weeks. Tenacious colonization of upper small digestion tracts by microorganisms, Dietary sensitivities, Carbohydrate narrow mindedness caused by harm to the brush outskirts of intestinal mucosa bringing about low levels of disaccharidases, Infant and kids with diminished host insusceptibility, postponed repair of intestinal harm on account of related protein vitality hunger are more inclined to endure extended loose bowels (Hossain, et. al., 2013).

Diarrhea is the passage of unusually loose or watery stools, usually at least three times within 24 hour period. Prolonged diarrhea may lead to excessive loss of fluid, salt and nutrient in the faeces. The main cause of death from acute diarrhea is dehydration, which result from loss of fluid and electrolyte in stool. Another important cause of death is dysentery and under nutrition (Suganthi, et. al., 2014). Diarrhea is an important cause of under nutrition because patients eat less during diarrhea and their ability to absorb nutrients is reduced. Moreover, nutrient requirement is increased as a result of infection (Sinclair et al., 2003). Risk factors that predispose children to diarrhea include poor sanitation, poor social and economic status and malnutrition.

REVIEW OF LITERATURE:

Acute gastrointestinal illnesses rank second only to acute respiratory illnesses as the most common

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disease worldwide. In children less than 5 years old, attack rates range from 2-3 illnesses per child per year in developed countries to 10-18 illnesses per child per year in developing countries. In Asia, Africa, and Latin America, acute diarrheal illnesses are a leading cause of morbidity (1 billion cases per year), and mortality (4-6 million deaths per year, or 12,600 deaths per day) in children (Kumar, et. al., 2014).

Diarrhea is an alteration in bowel movements characterized by an increase in the water content, volume, or frequency of stools. A decrease in consistency and an increase in frequency in bowel movements to > 3 stools per day have often been used as a definition for epidemiological investigations. "Infectious diarrhea" is diarrhea due to an infectious etiology. "Acute diarrhea" is an episode of diarrhea of < 14 days in duration. "Persistent diarrhea" is an episode of diarrhea > 14 days in duration, and "chronic diarrhea" is diarrhea that last for >30 days duration.

Microbiology: Many different bacteria can cause gastroenteritis. From studies of stool cultures performed in U.S. hospitals, the most commonly isolated bacterial pathogens are Campylobacter (42% of isolates), Salmonella (32%), Shigella (19%) and Escherichia coli O157:H7 (7%). Some organisms (Salmonella and Shigella species) are always associated with disease, while others (E. coli) are members of the commensal flora and become pathogenic when they acquire virulence factor genes on plasmids, bacteriophages, or pathogenicity islands.

Vibrio species: Vibrio are Gram negative bacilli that grow naturally in estuarine and marine environments worldwide, and can survive in contaminated waters with increased salinity and temperature (up to 37°C). There are 12 species of Vibrio that have been implicated in human infections, with the most prominent being Vibrio cholerae, parahaemolyticus and vulnificus. V. cholerae, the etiologic agent of cholera is sub classified based upon somatic O antigens. V. cholerae O1 and O139 are responsible for causing classic cholera which can occur in epidemics or worldwide pandemics.

Shigella species: Shigella is Gram negative bacilli that have four recognized species: S. sonnei, S. flexneri, S. dysenteriae, S. boydii. S. sonnei enteritis occurs predominantly in industrialized countries while S. flexneri occurs in developing countries. S dysenteriae results in the most severe infections and S. boydii is infrequently isolated. Humans are the only known reservoirs for Shigella.

Campylobacter species: Campylobacter are small, comma-shaped Gram negative bacilli with microaerophilic growth requirements. Thirteen species have been associated with human disease. C. jejuni, C. coli and C. upsaliensis are the most

common causes of Campylobacter gastroenteritis. A variety of animals serve as reservoirs, and humans acquire C. jejuni and C. coli infection through consumption of contaminated poultry, milk and other foods. C. jejuni produces histologic damage to the mucosal surfaces of the small and large intestines through invasion into intestinal cells; however, the exact role of the adhesins, cytotoxins, and enterotoxins detected in C. jejuni isolates are not well defined. C. jejuni and C. upsaliensis infection have been rarely associated with Guillain-Barre syndrome, an autoimmune disorder of the peripheral nervous system characterized by development of symmetrical weakness.

Salmonella species: Salmonella are Gram negative bacilli that have more than 2400 unique serogroups, but are broadly classified into typhoidal species (S. typhi and S. paratyphi) and nontyphoidal species (S. enteritidis and S. typhimurium are the most common isolates). S. typhi and S. paratyphi have no reservoirs other than humans and can cause disease with a very low inoculum. S. typhi produces a febrile illness called typhoid fever.

Escherichia coli: E. coli is a Gram negative bacillus and a facultative anaerobe. The strains of E. coli that cause gastroenteritis are divided into the following 6 groups: enterotoxigenic (ETEC), enteropathogenic (EPEC), enteroinvasive (EIEC), enterohemorrhagic (EHEC) or Shigalike toxin-producing E. coli (STEC), enter aggregative (EAEC), and diffusely adherent E. coli (DAEC). The clinical spectrum of diarrheal disease caused by these strains is dependent upon the characteristics of the secreted enterotoxin and plasmid-mediated virulence factors that allow for attachment and invasion of intestinal epithelium. ETEC produces heat-labile and heat-stable enterotoxins which affect the small intestines and cause a secretory diarrhea. EHEC produces cytotoxic Shiga Toxins (Stx-1 and Stx-2) that destroy intestinal villi and cause dysentery; EPEC causes diarrhea by destroying microvilli in the small intestines, while EIEC causes bloody diarrhea by causing destruction of epithelial cells in the large intestines. Diseases caused by ETEC and EPEC are seen most commonly in developing countries, occurring mostly in infants.

Although young nursing infants tend to have five or more motions per day, mothers know when the stooling pattern changes and their children have diarrhea (Dooki, et. al., 2014). The interval between two episodes is also arbitrarily defined as at least 48 hours of normal stools. These definitions enable epidemiologists to count incidence, relapses, and new infections (Das, et. al., 2007).

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TRANSMISSION

Diarrhea is caused by infectious organisms, including viruses, bacteria, protozoa, and helminths that are transmitted from the stool of one individual to the mouth of another termed fecal-oral transmission. Some are well known, others are recently discovered or emerging new agents, and presumably many remain to be identified. They differ in the route from the stool to the mouth and in the number of organisms needed to cause infection and illness. Among bacteria, the ability to survive stomach acid is an important determinant of the inoculum size required to cause illness (Lakshminarayanan and Jayalakshmy, 2015). For example, Shigella bacteria are resistant to low pH, and a few thousand organisms suffice, which are readily transferred by direct person-to-person contact or through contamination of inanimate objects, such as a cup. In contrast, bacteria readily killed by acid, such as Vibrio cholerae, require millions of organisms to cause illness, and therefore must first multiply in food or water to an infectious dose. Some pathogens, such as rotavirus, display a sharp host species preference, and others have a broad host range. Among Salmonella bacteria, certain bio-serotypes are adapted to infect animals and pose no threat to humans, and others are adapted to humans and do not infect animals (Kumar, et. al., 2015). The majority, however, are not adapted to a specific host and can infect either humans or domestic animals, thus facilitating transmission of these organisms to humans. Less than a dozen of the more than 2,500 individual Salmonella cause the majority of human infections, reflecting the requirement for genes that encode essential virulence factors.

LABORATORY DIAGNOSIS

Etiologic diagnosis of diarrhea is valuable for public health interventions and case management. Microbiological culture and microscopy remain the standard, despite their limited sensitivity. Their effectiveness is further reduced by antibiotic use, and patients with severe illness are more likely both to be cultured and to have taken antibiotics. Even when cultures are positive, the delay in laboratory identification limits their cost-effectiveness for managing individual patients (Rathaur, et. al., 2014). The information is always epidemiologically and clinically important; however, during epidemics, culturing every patient is unnecessary when the causative organism is known.

Antimicrobial resistance data are essential to guide initial antibiotic choices. New rapid tests to detect inflammatory mediators or white or red blood cells in stool offer the promise of distinguishing between secretory and inflammatory disease and optimizing case management (Samal, et. al., 2008). A high background level, probably from frequent infections, limits the use of such tests in developing countries, where they would be most useful.

CONCLUSION:

Diarrheal infections still seem, by all accounts, to be the main source of bleakness and mortality among youthful kids crosswise over Bangladesh. In the present examination, stool tests from 25 malnourished and 25 very much fed kids in a urban ghetto experiencing the runs were inspected to distinguish the causative microbes. Particular and differential media were utilized to encourage the confinement of the etiologic microorganisms from the complex microbial greenery in defecation. Bacteriological culture and confirmative biochemical tests were connected to recognize the bacterial species. Along these lines, chalking out the wellspring of the looseness of the bowels causing microbes together with ensuing preventive measures are of centrality in perspective of open wellbeing security.

Diarrheal disease is transmitted by ingesting contaminated food or drink, by direct person-to-person contact, or from contaminated hands. Randomized control trials have established that several child health interventions are effective in preventing and treating diarrhea in children. These include breast feeding, vaccination, oral rehydration therapy, micronutrient supplementation, hand washing, disinfection of water in the home and hygienic food preparation and storage.

In developing countries surface waters is often contaminated with pathogens due to contact with human and livestock waste. Drinking, handling, cooking and bathing exposes young people to diarrheal diseases. The lack of adequate water reduces the opportunity for bathing, and for washing food, dishes and clothing – thus contributing to the spread of disease.

REFERENCES:

Beena Uppal, Naz Parween, Prabhav Aggarwal, Shyam Kishore Kumar (2015). A Comparative Study of Bacterial and Parasitic Intestinal Infections in India. J. Clin. Diagn. Res., 9(3): pp. DC01-DC04.

Daniel, R., Diniz-Santos, Jose, S., Snatana, Junaura, R., Barretto, Maria Goreth (2005). M. Andrada; Luciana R. Silva. Epidemiological and microbiological aspects of acute Bacterial Diarrhea in children from Salvador, Bahia, Brazil. Brazilian J. Infect. Dis.,Vol. 9, No. 1, Salvador, Feb. 2005.

Haricharan, K.R., Shrinivasa, B.M., Vatsala Kumari (2013). Clinical and Bacteriological Study of

Acute Diarrhea in Children. J. Evol. Med. Dent. Sci., June 2013, http://www.jemds.com/latestarticles.php?at_id=1346.

Hossain, Md. Asif, Kohinoor Akter Raton and Rashed Noor (2013). Bacteriological study of Stool samples collected from children suffering from Diarrhea. J. Global Biosci., Vol. 2(5), pp. 160-165.

Mamatha Ballal, Suganthi, M., Devadas, Rituparna Chakraborthy, Vignesh Shetty (2014). Emerging trends in Etioloogy and Antimicrobial Susceptibility Pattern of Enteric Pathogens in Rural Coastal India. Int. J. Clin. Med., Vol. 5, No. 7 (2014), Article ID: 44744, 8 pages.

Manoj Kumar, Manisha Ramakrishana, Koram, Lalith Kumar (2014). Study of Various Causative Factors of Diarrheal Diseases with Special Reference to Bacteriological Profile among 0 to 5 Years Age Group. Int. J. Scientific Study, Vol. 2, Issue 3, pp. 47-52.

Mohammed Reza Ismaeili Dooki, Ramazan Rajabnia, Rahim Barari Sawadkohi. et al. (2014). Bacterial enteropathogens and antimicrobial susceptibility in children with acute diarrhea in Babol, Iran. Caspian J. Intern. Med.,1(5): pp. 30-34.

Das, S., R. Saha, S. Singhal (2007). Enteric Pathogens in North Indian Patients with Diarrhea. Indian J. Community Med., Vol. 32, Issue 1 page 27-31.

Subitha Lakshminarayanan, Ramakrishnan Jayalakshmy (2015). Diarrheal Diseases among Children in India: Current Scenerio and future perspectives. J. Nat. Sci. Biol. Med., 6(1) pp. 24-28.

Sunil Kumar, D., Chavan, K.H. Harshan (2015). Aerobic Bacteriological Study with their Antibiogram in Children Acute Diarrhea in North East Karnataka, India. Int .J. Curr. Microbiol. App.Sci., 4(11): pp. 700-706.

Vyas Kumar Rathaur, Monika Pathania, Apama Jayara, Neeraj Yadav (2014). Clinical Study of Acute Childhood Diarrhea Caused by Bacterial Enteropathogens. J. Clin. Diagn. Res., 8(5): pp. PC01-PC05.

Surya Kanta Samal, Hemant Kumar Khuntia, Prafulla Kumar Nanda, et al. (2008). Incidence of Enteropathogens among Hospitalized Diarrhea patients from Orissa, India. Jpn. J. Infect. Dis., 61: pp. 350-355.

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