

PREVENTION AND CONTROL OF CHOLERA IN ODISHA, INDIA

Diarrheal disorders particularly **cholera** put a significant threat causing **cholera outbreaks/epidemics (both in coastal and tribal areas) almost every year accounting for high morbidity and mortality in the state.** The significant contributions were to find out the causative agents like different bacterial enteropathogens specially different serogroups and serotypes of *V. cholerae* causing cholera for the early diagnosis, treatment, management and care of diarrhea patients to reduce the morbidity and mortality. The another aspect is to find out the **source of infection, modes of transmission and spread of the disease for implementing adequate control measures in time to check the spread of the disease to unaffected areas of the state.** I have been working in this field for **more than two decades starting from 1993 in close association with DHS, Govt. of Odisha.** Among different cholera outbreaks/epidemics, the post-cyclone-cholera epidemic of 1999 was devastating; where 7 coastal districts were affected and millions of people were infected with many deaths which were investigated by us. The causative pathogen was due to *V. cholerae* O1/O139 serogroups biotype El Tor (Chhotray *et al.*, 2002; *Epidemiol Infect*:128:131-138). The pathogen was isolated from the patients and also from the Erasama paddy field-water bodies (which was merged with sea water), from tube wells, open wells from different districts like undivided Cuttack/Kendrapada/Jagatsinghpur & Puri districts. The open wells in Sandhakuda area of Paradeep, tube wells of Erasama and Manijanga, Nimapada of Puri districts were positive for *V. cholerae* O1 Ogawa. The early reporting helped the state govt. to implement control measures like chlorinating different water sources which were procured through air as railway lines were disrupted. In one occasion I travelled with high level state govt. officials in the midnight to Sandhakuda (Paradeep), Erasama areas though I was seriously ill. **The notable cholera outbreaks were during 2000, 2002, 2002 to 2008---Surveillance work on diarrhea at Puri district, 2007 cholera epidemic in the tribal areas due to multi drug resistant and highly virulent *V. cholerae* O1 El Tor variant strain which is the first cholera epidemic from this state and also from the globe reported by us (Pal *et al.*, 2010; *IJID*:14:384-389).** The water samples were collected in the hilly mountain inaccessible areas in the mid night. The source of infection was nala, chua, stream and river water. **Four control measures were suggested to be implemented during cholera outbreak in the tribal areas; particularly in the flowing water bodies which is the innovative idea and it is working till now implemented by the state Govt**

and published(Pal *et al.*, 2017;JJID:70(5):549-553). One of our major contributions on cholera is that we have proved that “Puri is endemic for cholera”. Depending on our results the cholera vaccine trial was implemented in Puri district and it was giving protection. **The cholera epidemic in 2009 in Langigarh block of Kalahandi district was investigated.** The origin and spread of tetracycline resistant *V.cholerae* O1 El Tor variant carrying *ctxB* gene of classical strain causing cholera epidemic in Rayagada district during 2010 was investigated (Kar *et al.*,2015:IJID:33:45-49). Again the cholera outbreak in Mohana block during 2010, 2011; at Rayagada and Kalahandi during 2012 were investigated where reversal to tetracycline sensitivity of *V.cholerae* was observed (Pal *et al.*, 2015;JPAM:9(2):291-296). **The another achievement is the discovery of Haitian variants of *V. cholerae* O1 Ogawa causing second large cholera outbreak in the state/country/globe during 2014 from Narla block of Kalahandi district after the first Cholera epidemic in Haiti during 2010 was reported (Pal *et al.*, 2017;JJID:70(5):549-553). Though the Haitian variant *V. cholerae* O1 was reported from West Bengal in 2003; but we have proved it was originated from the coastal district of Odisha during 1999 for the first time (Pal *et al.*, 2021;IJID:105:730-732). The spread of Haitian variants *V. cholerae* O1 causing sequential outbreaks in coastal and tribal areas during 2016 and 2019 were reported (Pal *et al.*, 2021;IJMM; Nayak *et al.*, 2021;JJID:74(2):137-143). The new variant of *V. cholerae* O139 evolved in 2017 caused the first outbreak in Odisha, India and Globe was also reported by us (Pal *et al.*, 2019;JCM). The spread of altered El Tor *Vibrio cholerae* O1 (*ctxB1* and *ctxB7*) has been narrated from 1995 to 2019 in the state. The diarrheal outbreak reports were being submitted in time regularly to the concerned health authorities to implement control measures to check the spread of the disease to unaffected areas of the state. Depending on our major contribution during 2007, state govt. requested ICMR, New Delhi to establish two field units at Rayagada and Bhabanipatna of Kalahandi districts. Then two labs were set up during 2011 in both the districts for early diagnosis of cholera and other diseases. Meanwhile the technical staffs from both the districts were trained to work independently and the technology has been transferred.**

The major environmental reservoirs of *V. cholerae* in the flowing water bodies like river, stream were detected in the stagnant condition of water temporarily near the bank

and also in the water bodies partially encircled by stones in Rayagada district which is the first report in the globe (Pal *et al.*, 2021; Environ Microbiol Rep:13(2):119-125).

The Quadriplex PCR assay for simultaneous detection of biotype (Classical & El Tor), serotypes (O1 & O139), toxic genes like *tcpA* (classical & El Tor) and *toxR* (surface protein) for the rapid detection of *V. cholerae* isolated from diarrhoea patients and water bodies was developed and published (Khuntia *et al.*, 2008; JCM:46:2399-2401).

My notable and dedicated work is highly appreciated by Director of Public Health, different CDMOs, Collectors of different districts, the health ministers of the state and Ex.Director Generals of ICMR, New-Delhi also. The letter of appreciation for my dedicated work on the prevention and control of cholera in the state, particularly in the tribal areas was highly acknowledged and appreciated by the Ex-principal secretary of health, Govt. of Odisha.

I am not mentioning many difficult situations which are unbelievable but true; where I have discharged my best services for the sake of service to mankind in spite of dangers to life and also neglected the family.



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