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Identification of Vibrio Cholerae Serotypes and Epidemiological Trends During Cholera Outbreaks in Kerbala Province, Iraq

Ali Mohammed Salman Al-Yousif [1*], Etab Abdul-Ameer Al-Ogla[2]

[1] University of Kerbala, Faculty of pharmacy, Department of clinical laboratory sciences, Karbala, Iraq

Abstract

Cholera is an acute diarrheal disease caused by Vibrio cholerae, a gram-negative, comma-shaped bacterium. It causes severe, large-volume watery diarrhea, leading to dehydration and death if left untreated. It spreads through contaminated food and water via the oral-fecal route.

Aims: The present study aimed to compare cholera outbreaks in Kerbala city during 2015 and 2017, focusing on their duration, bacterial serotypes, and the role of local treatment plants as water sources in transmission.

Methods: This descriptive study was conducted among patients affected during outbreaks in September-November 2015 and during November 2017. It included 7609 patients in 2015 and 920 in 2017, along with 250 and 80 water samples collected from different sources during the respective cholera outbreak periods. Bacterial strains were isolated from stool and water samples and confirmed by culture and serotyping. Data collection involved direct patient visits and retrospective review of medical records. Inclusion criteria were based on physicians' clinical suspicion and adherence to the case definitions and detection protocols of the National Cholera Control Plan and the World Health Organization.

Results: Two cholera outbreaks occurred in Kerbala. The bacterial strains were isolated, serotyped, and confirmed from stool and water samples. Water from water purification plants (tap water) and rivers was tested. A total of 188

Address for correspondence: Ali Mohammed Salman Al-Yousif *, University of Kerbala, Faculty of Pharmacy, Department of Clinical Laboratory Sciences, Karbala, Iraq. E-mail: ali.m.salman@uokerbala.edu.iq

laboratory-confirmed cholera cases were recorded during the 2015 outbreaks, and 21 of 250 water samples from rivers tested positive. In contrast, during the 2017 outbreak, 76 confirmed cholera cases were reported, with no positive findings among the 80 water samples collected from all water sources. A relatively short period of cholera incidence was observed, spanning from autumn through early winter (September to the end of November). During the 2015 outbreaks, cholera incidence was observed during a relatively short seasonal extension from early autumn to late November. Although 3 serotypes (Inaba and Ogawa) were reported in patients, NAG was reported in water sources. During the 2015 outbreaks, water samples were positive; during the 2017 outbreaks, water samples from different sources were tested for cholera, with none testing positive. Ultimately, all strains recovered during the 2015 and 2017 outbreaks were found to belong to a single serotype (Inaba). **Conclusion**: Cholera cases in Kerbala decreased from 2015 to 2017, underscoring the impact of public health interventions. Nevertheless, remaining essentially vigilant community health and reducing healthcare burdens, but ongoing vigilance remains vital during mass gatherings and seasonal peaks.

Keywords: Epidemiology, outbreak, serotypes, Vibrio cholerae