

Cholera: Risk Factors of Cholera and Treatment

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Abstract

Cholera is a bacterial disease usually spread through contaminated water. Cholera causes severe diarrhea and dehydration. Left untreated, cholera can be fatal within hours, even in previously healthy people.

Cholera is an acute, secretory diarrhea caused by infection with *Vibrio cholerae* of the O1 and O139 serogroups. Cholera is endemic in over 50 countries and also causes large epidemics. Since 1817, seven cholera pandemics have spread from Asia to much of the world. The 7th pandemic began in 1961 and affects 3–5 million people each year, killing 120,000. Although mild cholera may be indistinguishable from other diarrheal illnesses, the presentation of severe cholera is distinct, with dramatic diarrheal purging. Management of patients with cholera involves aggressive fluid replacement; effective therapy can decrease mortality from over 50% to less than 0.2%. Antibiotics decrease volume and duration of diarrhea by 50% and are recommended for patients with moderate to severe dehydration. Prevention of cholera depends on access to safe water and sanitation. Two oral cholera vaccines are available and the most effective use of these in integrated prevention programs is being actively evaluated.

Cholera is an acute secretory diarrhea caused by the Gram-negative bacterium *Vibrio cholerae*. Cholera epidemics have been recently increasing in intensity, duration and frequency, highlighting the need for more effective approaches to prevention and control.

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Introduction

In 1817, cholera spread beyond the Indian subcontinent and there were six world-wide cholera pandemics between 1817 and 1923. Between 1849 and 1854, London physician John Snow proposed that cholera was a communicable disease and that stool contained infectious material [1]. He suggested that this infectious material could contaminate drinking water supplies, resulting in transmission of cholera. Filippo Pacini, working independently in Italy in 1854, first observed comma-shaped forms under a microscope in cholera stools. In 1884, Robert Koch first isolated *V. cholerae* in pure culture in work that began in Egypt and continued in Calcutta (Kolkata), India. The ongoing seventh cholera pandemic began in Indonesia in 1961 and spread through Asia to Africa, Europe, and Latin America. Descriptions of a disease thought to be cholera are found in Sanskrit back to the 5th century BC, and the disease has existed on the Indian subcontinent for centuries. This pandemic is caused by a new biotype of *V. cholerae* first isolated in El Tor, Egypt [2]. Although cholera is vastly under-reported, the WHO estimates

that there are 3–5 million cases per year, predominantly in Asia and Africa, with periodic outbreaks such as recently in Haiti. Diarrheal diseases including cholera are the second leading cause of mortality worldwide among children under 5 years of age, and a principal cause of morbidity. Cholera is also a major cause of severe dehydrating diarrhea in adults.

Symptoms

Cholera is an extremely virulent disease that can cause severe acute watery diarrhoea. It takes between 12 hours and 5 days for a person to show symptoms after ingesting contaminated food or water [3]. Cholera affects both children and adults and can kill within hours if untreated. Most people infected with *V. cholerae* do not develop any symptoms, although the bacteria are present in their faeces for 1-10 days after infection and are shed back into the environment, potentially infecting other people. Among people who develop symptoms, the majority have mild or moderate symptoms, while a minority develop acute watery diarrhoea with severe dehydration. This can lead to death if left untreated [4].

1. Most of those infected will have no or mild symptoms and can be successfully treated with oral rehydration solution.
2. A global strategy on cholera control, Ending Cholera: a global roadmap to 2030, with a target to reduce cholera deaths by 90% was launched in 2017.
3. Researchers have estimated that each year there are 1.3 to 4.0 million cases of cholera, and 21 000 to 143 000 deaths worldwide due to cholera.
4. Cholera is an acute diarrhoeal disease that can kill within hours if left untreated.
5. Provision of safe water and sanitation is critical to prevent and control the transmission of cholera and other waterborne diseases.

Diarrhea: Cholera-related diarrhea comes on suddenly and can quickly cause dangerous fluid loss as much as a quart (about 1 liter) an hour. Diarrhea due to cholera often has a pale, milky appearance that resembles water in which rice has been rinsed [5].

Nausea and vomiting: Vomiting occurs especially in the early stages of cholera and can last for hours.

Dehydration: Dehydration can develop within hours after cholera symptoms start and range from mild to severe. A loss of 10% or more of body weight indicates severe dehydration.

Risk Factors of Cholera

Increases the chances of developing Cholera many things are included:

Type O blood: For reasons that aren't entirely clear, people with type O blood are twice as likely to develop cholera compared with people with other blood types [6].

Poor sanitary conditions: Cholera is more likely to flourish in situations where a sanitary environment-including a safe water supply is difficult to maintain. Such conditions are common to refugee camps, impoverished countries, and areas afflicted by famine, war or natural disasters [7].

Reduced or nonexistent stomach acid. Cholera bacteria can't survive in an acidic environment, and ordinary stomach acid often serves as a defense against infection. But people with low levels of stomach acid-such as children, older adults, and people who take antacids, H-2 blockers or proton pump inhibitors-lack this protection, so they're at greater risk of cholera [8].

Household exposure: You're at increased risk of cholera if you live with someone who has the disease.

Raw or undercooked shellfish: Although industrialized nations no longer have large-scale cholera outbreaks, eating shellfish from waters known to harbor the bacteria greatly increases your risk [9].

Treatment

Cholera vaccine

For adults traveling from the United States to areas affected

by cholera, a vaccine called Vaxchora is available in the United States. It is a liquid dose taken by mouth at least 10 days before travel.

Several other countries offer oral vaccines as well. Contact your doctor or local office of public health for more information about these vaccines [10]. Even with the vaccine, it's important to take the above precautions to prevent cholera.

Conclusions

Despite strong evidence for cholera transmission via foodborne-, hygiene-, waterborne- and close personal contact-related pathways in both domestic and public domains, we found that non-waterborne-related factors are understudied. Future cholera case-control studies would benefit from investigating all transmission vehicles and transmission domains.

Future case-control studies in cholera outbreak settings could benefit from adopting a set of standard practices. Data collection will always be constrained by time and resources in a crisis setting, meaning that ideal procedures including culture-confirmed case definitions and serological screening of controls may not be feasible. However, other improvements would require few additional resources, to investigate various modes of cholera transmission; we systematically identified 69 case-control studies investigating cholera transmission. Our review of cholera case-control studies revealed that cholera spreads via diverse pathways, reinforcing previous research indicating this to be the case. However, we find that food-, personal contact- and hygiene-related exposures are understudied given their demonstrated importance to transmission in the subset of studies that did assess these risk factors. Similarly, both the domestic and public domains of transmission appear with similar frequencies in the studies. However, the lack of standard exposures investigated across all studies makes summarisation across the studies more difficult. We searched two electronic databases for published case-control studies that investigated risk factors for cholera and included any publications that did not match our exclusion criteria. From the included studies, we grouped exposures using two parameters, whether transmission domain was public or domestic, and also on the vehicle of transmission. We extracted data on study location, method of case and control inclusion, type of statistical analysis performed and which exposures were included. Additionally, two parallel subgroup analyses were performed. The first included the subgroup of all studies that used culture-confirmed cholera cases, and the second included the subgroup of all studies employing a multivariate analysis.

Acknowledgement

None

Conflict of Interest

None

References

- 1 Lippi D, Gotuzzo E (2014) the greatest steps towards the discovery of *Vibrio cholerae*. *Clin Microbiol Infect* 20: 191-195.
- 2 Jugder BE, Batista JH, Gibson JA, Cunningham PM, Asara JM, et al. (2022) *Vibrio cholerae* high cell density quorum sensing activates the host intestinal innate immune response. *Cell Reports* 40: 111368.
- 3 Jugder BE, Watnick PI (2020) *Vibrio cholerae* Sheds Its Coat to Make Itself Comfortable in the Gut. *Cell Host & Microbe* 27: 161-163.
- 4 Song Tianyan, Mika Franziska, Lindmark Barbro, Schild Stefan, Bishop Anne, et al. (2008) A new *Vibrio cholerae* sRNA modulates colonization and affects release of outer membrane vesicles. *Molecular Microbiology* 70: 100-111.
- 5 Davis B, Waldor MK (2003) Filamentous phages linked to virulence of *Vibrio cholerae*. *Curr Opin Microbiol* 6: 35-42.
- 6 Schillberg E, Bryson L, Delva-Senat R, GrandPierre, Lenglet A, et al. (2016) Factors Related to Fetal Death in Pregnant Women with Cholera, Haiti, 2011-2014. *Emerging Infectious Diseases* 22: 124-127.
- 7 Johnsborg O, Eldholm V, Haavarsstein L (2007) Natural genetic transformation: prevalence, mechanisms and function. *Department of Chemistry* 158: 767-778.
- 8 Matthey N, Blokesch M (2016) The DNA-Uptake Process of Naturally Competent *Vibrio cholerae*. *Trends Microbiol* 24: 98-110.
- 9 Siddique AK, Baqui AH, Eusof A, Haider K, Hossain MA, et al. (1991) Survival of classic cholera in Bangladesh. *The Lancet* 337: 1125-1127.
- 10 Shigematsu M, Meno Y, Misumi H, Amako K, (1995) the measurement of swimming velocity of *Vibrio cholerae* and *Pseudomonas aeruginosa* using the video tracking methods. *Microbiol Immunol* 39: 741-4.