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Rise in cholera amid COVID-19: Spotlight on Pakistan and Bangladesh

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The Lancet Regional Health - Southeast Asia 2022;4: 100041
https://doi.org/10.1016/j.lansea.2022.100041

Despite seven pandemics and widespread epidemics throughout the globe, the combat against cholera is not over yet. The disease is characterised by severe watery diarrhoea leading to dehydration and hypovolemic shock resulting from exposure to the flagellum-possessing highly-motile, gram-negative, comma-shaped bacilli, the *Vibrio cholerae,* predominantly transmitted via the faecal-oral route and occasionally shellfish consumption.[1] Although numerous pathologic and non-pathologic serogroups exist, majorly only two have been implicated in breakouts, i.e., O1 and O139.[2] Following ingestion of contaminated food, the bacteria battle their way through the stomach acid barrier paving towards the small intestine epithelium via chemotaxis. Upon reaching, it proliferates and colonizes the epithelial cells, initiating the secretion of cholera toxin. Regarded as the major virulence factor, the cholera toxin is composed of two subunits: A and B. While subunit-B assists in adherence to the cell surface, the A subunit enzymatically stimulates adenylate cyclase to enhance cyclic AMP (cAMP) synthesis, which in turn activates protein kinase A. Hence, inhibiting the absorption of sodium chloride and culminating in the increased efflux of chloride, hydrogen-carbonate, sodium ions, potassium, and water.[3]

The incubation period varies from half to 5 days, following which the disease manifests as diarrhoea, vomiting, fatigue, and dehydration. If not managed properly, it can exacerbate causing hypovolemic shock, renal failure, and death. Since rehydration therapy is the mainstay of treatment for diarrhoeal diseases, the diagnostic tests are often not ordered as they do not significantly impact the course of treatment. However, they play a substantial role in recognising outbreaks. While culture followed by agglutination remains the gold standard diagnostic technique, the rapid diagnostic tests (RDTs) employing antibody-based immunochromatographic assays, are more commonly employed, owing to their adequate sensitivity specificity and rapid results.[3]

Over the last few decades, substantial work has been done to ensure safe water accessibility, improved sanitation, increased awareness, and mass cholera vaccination. The currently available oral cholera vaccines (OCV) are live attenuated vaccines that require the administration of two subsequent doses with a gap of two weeks. It demonstrates a 56 percent efficacy and 83 percent effectiveness during the first year and effects lasting for as long as five years.[4] Furthermore, to improve global vaccine accessibility and affordability, the World Health Organization (WHO), alongside multiple partner institutions, initiated the OCV stockpile in 2011, aiming to combat both emergency and emerging outbreaks.[5]

The disease carries an estimated global prevalence of 2.9 million (1.3-4 million) and causes 95,000 (21,000-143,000) deaths, with Sub-Saharan Africa and South-East Asia reporting 60 and 29 percent cases, respectively.[2] South Asia has always been an epicenter of the disease, with the origin of six of the seven pandemics. The Ganges-Brahmaputra delta, situated in Bangladesh and the West Bengal state of India, is referred the "homeland of cholera".[6] Despite prolonged persistence and significant developments, these countries still remain a focus of cholera. With an ever-increasing population, burdening the already saturated safe drinking water supply, housing, sanitation system, and infrastructure, climatic disasters like flooding, underreporting, and lack of nationwide data further predispose these countries to outbreaks.[6]

The Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) emerged towards the end of 2019, with the first case arising in Wuhan, China. Despite preventive measures by the government, the drastic spread continued leading to the WHO declaring it a pandemic in March 2020. The virus spreads via airway droplets and manifests with complaints of dry cough, shortness of breath, loss of smell, fever, and fatigue.[7] As of 09

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June 2022, 5.3 billion confirmed cases alongside 6.3 million deaths have been reported worldwide. Likewise, the disease caused significant morbidity and mortality in South Asia, with 1.9 million confirmed cases originating in Bangladesh and 1.5 million affected by the virus in Pakistan.[8] During the initial phase of the COVID-19 pandemic, people became more health-oriented, with a specific focus on masks, hand hygiene, and social distancing, which helped break the epidemiological triad. However, lately in 2022, with the ease of restrictions and life returning to normal, mass gatherings, outside food, and traveling are again becoming the routine, potentially contributing to the diseases like cholera. Lastly, since December 2019, SARS-CoV-2 and its control have remained the major epicenter of healthcare policies and efforts, putting aside the easily avoidable and treatable diseases like diarrhoea, which accounted for 1.6 million deaths in 2017.[9]

Since the beginning of 2022, an unprecedented rise in cholera has been observed in Pakistan and Bangladesh, making it a rising health threat. According to the Field Epidemiology and Disease Surveillance Division (FEDSD) of the National Institute of Health, Islamabad (NIH), as of 17th April 2022, 6,231 suspected cholera cases have been reported, as shown in Table 1. The distribution varied across the country, with Khyber Pakhtunkhwa, Sindh, Punjab, and Balochistan reporting 2,596, 1,873, 956, and 697 respectively.[10] The European Center for Disease Control and Prevention (ECDC), as of 27th April 2022, reports 129 laboratory-confirmed cholera cases in just Karachi, Pakistan.[11] The situation appears more grievous in Bangladesh, where according to the ECDC, a total of 495,433 suspected cholera cases and 29 deaths have been reported, with 33,832 cases from Rohingya Refugee Camp in Cox's Bazar, Bangladesh.[11] As of 13th March 2022, 47 cases are laboratory-confirmed.[12] Similarly, the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) reports daily hospital diarrhoeal admissions in Dhaka exceeding over a thousand for the first time in the past 60 years with 1,057 patients admitted on 16th March and the count reaching the all-time highest on 28th March with 1,334 admissions.[13] Current reports suggest a potential Cholera outbreak predominantly affecting Dhaka since the beginning of the year. However, other major cities like Chittagong, Khulna, Barisal, Mymensingh, Rangpur, Sylhet, and Rajshahi are also struck by it.[11] As of the latest, the WHO has instructed the Sindh government to set up separate cholera wards in all tertiary hospitals.[14] Similarly, the Bangladesh government in association with the WHO, plans to administer oral cholera vaccine to 2.3 million non-pregnant individuals (older than 1 year) located at diarrhoea-susceptible regions.[15]

Epi-week	Time period	Cholera cases
Week 1	3th - 6th January	271
Week 2	10th - 16th January	396
Week 3	17th - 23rd January	361
Week 4	24th - 30th January	482
Week 5	31st January - 6th February	424
Week 7	14th - 20th February	414
Week 8	21st - 27th February	511
Week 9	28th February - 6th March	448
Week 10	7th - 13th March	475
Week 11	14th - 20th March	1075
Week 12	21st-27th March	413
Week 13	28th March - 3rd April	360
Week 14	4th - 10th April	233
Week 15	11th - 17th April	368
Total		**6231**

***Table 1*: Reported cholera cases according to the Field Epidemiology and Disease Surveillance Division (FEDSD) of the National Institute of Health (NIH), Islamabad.**

Along with the deteriorating impacts on the global economy and food insecurity, the ongoing COVID-19 pandemic took an enormous toll on the healthcare systems of low-to-middle income countries, overburdening the already limited resources with beds, ventilators, medicines, oxygen, and vaccine shortages posing several challenges. With Pakistan, and Bangladesh trying to recuperate from the detrimental effects of the pandemic, another outbreak will further debilitate the recovering healthcare system. It is high time healthcare authorities take immediate measures to control the alarming escalation. Otherwise, already pandemic-struck economies may exhaust bearing two subsequent pandemics.

To overcome this formidable threat, the authorities must ensure universal access to clean water and proper sanitation, along with public awareness campaigns promoting the use of boiled and chlorinated water. Moreover, there's an overwhelming need to develop appropriate nationwide surveillance and reporting systems to determine the situation's precise incidence, and severity, make well-planned strategies and monitor their effectiveness. Additionally, governments must launch mass oral cholera vaccination campaigns in frequently affected areas. Stated the economic standings of the two countries, both Pakistan and Bangladesh can collaborate with the WHO and obtain OCV via the cholera vaccine stockpile project, hence not overburdening the already suffering economies. Other than preventive measures, the healthcare authorities must ensure hospital facilities and resources are adequate enough to accommodate patients, in case the outbreak exacerbates. Lastly, further acute diarrhoeal causes like typhoid, Rotavirus, Norovirus, and others must also be investigated as a potential cause behind rising diarrhoeal cases.

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Declaration of interests

None.

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