

Perspective

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Polio in Gaza: Another disastrous outcome of the Gaza conflict, 2023−2024

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On October 7th, 2023, a devastating conflict erupted between Gaza and Israel, causing around 40 000 deaths and over 90 000 injuries. The war has displaced more than 1.9 million people, who now live in overcrowded tent camps facing severe shortages of clean water, sanitation, fuel, electricity, and food. Many rely on international aid and resort to unsafe methods for basic needs[1]. The Gaza Strip, a tiny coastal area of just 365 square kilometers with 2.3 million residents, is one of the world's most densely populated regions. Already burdened by inadequate infrastructure, the ongoing war has worsened conditions, caused the collapse of sewage and water systems and severely disrupted daily life. This devastation has created a breeding ground for infectious diseases, especially among the displaced people living in overcrowded camps[2,3]. Before the current conflict, Gaza had been polio-free for over 25 years, thanks to successful vaccination campaigns in the late 1990s that achieved around 99% coverage. However, a combination of factors has led to a fragile public health situation, resulting in the reemergence of poliovirus. The ongoing violence has severely disrupted healthcare services, causing routine immunization rates to drop significantly. Specifically, coverage for the second dose of the inactivated polio vaccine fell from 99% in 2022 to under 90% by early 2024[4,5].

1. Poliovirus in Gaza−Palestine during the current conflict 2023−2024

In the context of the ongoing conflict in Gaza, it is concerning to report that strains of poliovirus have been identified in six wastewater samples from environmental monitoring sites in Khan Younis and Deir al-Balah cities in Gaza Strip, where hundreds of thousands of displaced people are living in dire conditions. Genetic analysis reveals that these strains are not only related to each other but also closely linked to a variant that was circulating in Egypt in the latter half of 2023, with the last detection in Egypt occurring in December 2023. The genetic evidence suggests this variant could have entered Gaza as early as September 2023[6,7]. In addition to the virus being detected in sewage samples from Deir al-Balah and Khan Younis, as previously reported, a 10-month-old unvaccinated child from Deir al-Balah in Gaza was confirmed to have contracted polio—the first case in Gaza in 25 years. In response, the World Health Organization (WHO) and its partners have decided to conduct two rounds of polio vaccination in the coming weeks to halt the spread of the disease[8]. In Gaza, the healthcare system is severely disrupted, with only 16 of 36 hospitals and 45 of 105 primary care centers operational, leading to a sharp decline in vaccination rates. The war has crippled essential services: trash is piling up, water sources are damaged, and the sewage plant's collapse has caused widespread contamination. In addition, widespread malnutrition further aggravated the situation, increasing the spread of infectious diseases, including polio[9].

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2. Potential causes of polio in Gaza amid the current conflict

The current conflict in Gaza is especially tragic, with recent polio detection in sewage and a confirmed case in a child intensifying public health concerns. The spread of polio is worsened by critical factors amplified by the conflict. Since this war began in October 2023, about 70% of Gaza's water and sanitation facilities have been severely damaged, creating dire living conditions for residents[10]. Another critical risk factor is that the vast majority of displaced people are living in overcrowded shelters with poor sanitation. In some areas, there is just one toilet for every 700 people, making it nearly impossible to maintain the hygiene needed to prevent the spread of infectious diseases like polio[11]. Moreover, another critical risk factor is the near-total destruction of many hospitals and health facilities in Gaza due to the war, which has severely hampered the ability to continue polio vaccination efforts[9]. Additionally, the conflict has displaced over 1.9 million people into temporary camps. This influx has stretched already limited resources and worsened health conditions, creating an ideal environment for the rapid spread of diseases[12,13]. It's also crucial to note that streets and areas near displacement camps are inundated with hundreds of thousands of tons of accumulated garbage and overflowing sewage due to the conflict's damage to sewage networks. This has led to a surge in insect populations, particularly flies and mosquitoes[14]. Houseflies, in particular, are notorious for their role in mechanically transmitting pathogens, including poliovirus[15].

The dissemination of poliovirus in Gaza is a complex dilemma, fueled by crumbling sanitation systems, disrupted healthcare, rising displacement, and gaps in vaccination coverage. Tackling these intertwined issues is crucial to stopping a wider outbreak and safeguarding public health amid the ongoing conflict. Given the heightened risk of infectious diseases, particularly polio, in Gaza during this conflict, it is vital for health organizations to urgently deliver vaccines to curb the spread. Relief agencies must ensure that drinking water in displacement camps is adequately sterilized. Additionally, there is a pressing need for increased awareness about infectious diseases[16] and for efforts to remove garbage, maintain cleanliness, and supply cleaning materials to the displaced, despite ongoing restrictions due to the conflict.

Conflict of interest statement

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Authors' contributions

Z.D. is the original author of the research, responsible for collecting the information, writing the article, reviewing it, and revising it to meet the journal's requirements. M.A. assisted with information collection and provided a review of the article. S.B. conducted the final review and oversaw the overall supervision of the work.

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