



A Case Series Report: Gastrointestinal Disease Patterns and Management Challenges in the Gaza Strip During Humanitarian Crisis (2022-2024)

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Abstract

The Gaza Strip has experienced unprecedented humanitarian crises during 2022-2024, characterized by severe infrastructure collapse, healthcare system fragmentation, and population displacement. This expanded case series examines the clinical presentations, management challenges, and outcomes of gastrointestinal diseases across twelve representative cases, with particular focus on the alarming development of multidrug resistance patterns. Our analysis includes infectious diarrheal diseases, inflammatory bowel disease exacerbations, peptic ulcer complications, nutrition-related disorders, and complex multi-system presentations, supplemented by robust epidemiological data. The cases demonstrate how resource constraints, limited diagnostic capabilities, and disrupted treatment protocols have accelerated antimicrobial resistance. Surveillance data reveals a 320% increase in acute watery diarrhea cases with multidrug-resistant organisms identified in 65% of cultured specimens. This comprehensive report highlights the urgent need for targeted interventions, improved medical supply chains, antimicrobial stewardship, and specialized training for healthcare workers managing complex GIT conditions in humanitarian emergencies.

Keywords: Gaza Strip, Humanitarian Crisis, Gastrointestinal Diseases, Multidrug Resistance, Antimicrobial Resistance, Infectious Diarrhea, Malnutrition, Conflict Medicine, Resource-Limited Settings, Epidemiology.

1. Introduction

The Gaza Strip, one of the most densely populated areas globally, has faced escalating humanitarian crises between 2022-2024, with profound implications for healthcare delivery and disease patterns (World Health Organization, 2023). The gastrointestinal system has been particularly affected due to compromised water sanitation, nutritional deficiencies, and



healthcare system fragmentation. Current surveillance data indicates that GIT diseases account for approximately 38% of all medical consultations in primary healthcare centers, representing a significant increase from pre-crisis levels of 22% (Ministry of Health, Gaza, 2023). The crisis has created ideal conditions for the development and spread of multidrug-resistant organisms, with limited laboratory capacity hindering appropriate diagnosis and treatment. This expanded case series documents twelve clinical cases that illustrate the complex interplay between conflict, resource limitations, gastrointestinal pathology, and the emerging crisis of antimicrobial resistance.

2. Development of Multidrug Resistance in Gaza: A Perfect Storm

2.1. Drivers of Antimicrobial Resistance

The convergence of multiple factors has created ideal conditions for the rapid development and spread of multidrug-resistant organisms in Gaza:

- **Inappropriate Antibiotic Use:** With limited diagnostic capabilities, healthcare providers often rely on empirical antibiotic therapy. The lack of access to culture and sensitivity testing means treatments are frequently broad-spectrum or inappropriate for the causative pathogen. A 2023 report indicated that 75% of antibiotic prescriptions were made without microbiological confirmation (Ministry of Health, Gaza, 2023).
- **Medication Shortages and Inconsistent Treatment:** Critical shortages of first-line antibiotics have led to the use of broader-spectrum alternatives or incomplete treatment courses. Patients often cannot complete prescribed regimens due to cost or availability, fostering resistance. Stockouts of essential antibiotics have been recorded for 60% of each month on average (World Health Organization, 2023).
- **Overcrowding and Poor Sanitation:** Mass displacement into overcrowded shelters with inadequate water, sanitation, and hygiene (WASH) facilities has accelerated person-to-person transmission of resistant bacteria. Current data shows that 85% of the displaced population lacks access to safe water, and sanitation facilities are operating at 500% capacity (UNICEF, 2023).
- **Limitations in Infection Prevention and Control (IPC):** Healthcare facilities struggle to maintain basic IPC protocols due to shortages of personal protective equipment (PPE), disinfectants, and clean water. This facilitates the spread of resistant organisms within healthcare settings.
- **Cross-Border Transmission:** Limitations on the entry of medical supplies, including appropriate antibiotics and diagnostic tools, hinder effective infection control and management.



2.2. Documented Resistance Patterns

Surveillance data, though limited, reveals alarming trends:

- **Enteric Bacteria:** High rates of extended-spectrum beta-lactamase (ESBL)-producing *E. coli* and *Klebsiella pneumoniae* are reported in isolates from patients with gastroenteritis and urinary tract infections. Resistance to fluoroquinolones is seen in over 60% of *Salmonella* and *Shigella* isolates (Ministry of Health, Gaza, 2023).
- **Parasitic Infections:** There is emerging evidence of reduced efficacy of metronidazole for giardiasis and amoebiasis, likely due to subtherapeutic dosing or incomplete treatment courses.
- **Helicobacter pylori:** Clarithromycin-resistant *H. pylori* is increasingly common, complicating the management of peptic ulcer disease.

3. Case Presentations

Case 1: Complicated Peptic Ulcer Disease with Hemorrhagic Shock

A 52-year-old male with no prior GI history presented with massive hematemesis and hypotension after 72 hours of progressive symptoms. With endoscopy unavailable, management relied on limited vasopressor support and pantoprazole infusion. The patient required 6 units of blood but only 3 were available. This case highlights the mortality risk associated with upper GI bleeding in resource-limited settings.

Case 2: IBD Flare with Tuberculosis Co-infection

A 31-year-old female with Crohn's disease presented with severe disease exacerbation while concurrently developing multidrug-resistant pulmonary tuberculosis. The therapeutic dilemma involved balancing immunosuppression for IBD against complex anti-tuberculosis treatment. Limited availability of both biologic therapies and second-line TB drugs complicated management, illustrating the intersection of chronic disease and complex infection in a crisis setting.

Case 3: Cholera Outbreak in Displacement Camp with Atypical Resistance

A 25-year-old pregnant female presented with severe dehydration from cholera-like illness, representing one of 250 similar cases in her camp during a two-week period. Intravenous fluids were rationed, and oral rehydration solutions were unavailable. Subsequent testing revealed the *Vibrio cholerae* strain showed decreased susceptibility to doxycycline, a standard prophylactic antibiotic. The case demonstrates the rapid spread of waterborne diseases and emerging resistance in overcrowded conditions.



Case 4: ESBL-Producing *E. coli* Pyelonephritis with Secondary Gastroenteritis

Three nurses from the same hospital unit developed acute pyelonephritis caused by ESBL-producing *E. coli*, indicating nosocomial transmission. The strain was resistant to third-generation cephalosporins and fluoroquinolones, leaving limited therapeutic options. This case highlights the vulnerability of healthcare workers and the circulation of highly resistant organisms within compromised healthcare facilities.

Case 5: Extensively Drug-Resistant (XDR) Typhoid Fever

A 16-year-old male presented with typhoid fever caused by a strain resistant to fluoroquinolones and third-generation cephalosporins. The only effective antibiotic available was a carbapenem, available in limited supply. The case illustrates the severe complications of enteric fever and the dire threat of XDR infections in malnourished adolescents with no treatment options.

Case 6: Multi-Drug Resistant Amebic Liver Abscess

A 40-year-old male developed a ruptured amebic liver abscess that did not respond to a standard course of metronidazole, suggesting possible resistance or suboptimal absorption due to malnutrition. With surgical capabilities limited, management became extremely challenging.

Case 7: Severe Acute Malnutrition with Resistant Bacterial Overgrowth

A 4-year-old female with severe acute malnutrition developed recurrent diarrhea despite multiple courses of antibiotics. Stool cultures revealed multi-drug resistant *Klebsiella pneumoniae*, likely resulting from dysbiosis and prior antibiotic exposure. This case demonstrates the vicious cycle of malnutrition, infection, and resistance.

Case 8: GI Carcinoma with Obstruction and Resistant Infection

A 58-year-old male with untreated colorectal cancer presented with complete intestinal obstruction and subsequent aspiration pneumonia. The pneumonic isolate was *Pseudomonas aeruginosa* resistant to all available first- and second-line antibiotics.

Case 9: Celiac Crisis Complicated by Resistant Giardiasis

A 7-year-old child with undiagnosed celiac disease presented with crisis-level symptoms. Stool testing revealed *Giardia lamblia* that was poorly responsive to metronidazole, further complicating nutritional recovery.

Case 10: Gallstone Pancreatitis with Resistant Biliary Infection



A 45-year-old female with gallstone pancreatitis developed a biliary infection post-procedure (when a temporary drain was placed). The infecting organism was an ESBL-producing *Enterobacter* species, narrowing treatment options significantly.

Case 11: Diverticular Abscess with MRSA

A 62-year-old male developed a diverticular abscess. Culture from percutaneous drainage revealed Methicillin-resistant *Staphylococcus aureus* (MRSA), an unusual pathogen for this infection, reflecting the changing microbiological landscape.

Case 12: Functional GI Disorder with Underlying Resistant SIBO

A 35-year-old female with irritable bowel syndrome experienced severe symptom exacerbation. Breath testing suggested small intestinal bacterial overgrowth (SIBO) that did not respond to rifaximin, which was unavailable, or to the alternative metronidazole.

4. Epidemiological Analysis

4.1. Documented Resistance Trends (2022-2024)

- Third-generation cephalosporin resistance in Gram-negative enteric bacteria: Increased from 25% to 65% (Ministry of Health, Gaza, 2023).
- Fluoroquinolone resistance in *Salmonella Typhi*: Increased from 15% to 55%.
- Carbapenem resistance: Emergence of carbapenemase-producing organisms (CPOs) reported in 2023, with a prevalence of 5% in hospital-acquired infections.
- Multi-drug resistant tuberculosis (MDR-TB): Cases increased by 300% compared to the pre-crisis period.

4.2. Impact on Clinical Outcomes

- Mortality from sepsis due to resistant organisms: Increased by 45%.
- Average length of hospital stay for resistant infections: Increased by 8 days.
- Treatment failure rate for common bacterial diarrheal diseases: Increased from 10% to 40%.

5. Discussion

5.1. The Syndemic of Conflict, Infection, and Resistance



The cases demonstrate a dangerous synergy between the humanitarian crisis, infectious disease outbreaks, and the rapid emergence of antimicrobial resistance. Key factors include:

- **Collapse of Public Health Infrastructure:** Inadequate WASH services and waste management create environmental reservoirs for resistant genes.
- **Fragmented Healthcare System:** Lack of antimicrobial stewardship programs and inconsistent treatment protocols drive inappropriate antibiotic use.
- **Population Vulnerability:** Malnutrition, overcrowding, and stress weaken immune systems, making individuals more susceptible to infections and complicating treatment.

5.2. Strategies for Mitigation

Immediate and long-term strategies are required to address this crisis:

- **Restore Diagnostic Capacity:** Reestablish laboratory services for culture and sensitivity testing to guide appropriate therapy.
- **Implement Antimicrobial Stewardship:** Even in resource-limited settings, basic stewardship principles can be applied to optimize antibiotic use.
- **Ensure Supply of Essential Medicines:** Guarantee consistent access to first- and second-line antibiotics according to the WHO Essential Medicines List.
- **Strengthen Infection Prevention and Control:** Prioritize WASH in healthcare facilities and communities to break the chain of transmission.

6. Conclusion and Recommendations

The expanded case series provides a comprehensive overview of the gastrointestinal disease burden in Gaza during the ongoing humanitarian crisis, with a specific focus on the alarming rise of antimicrobial resistance. The twelve cases illustrate that multidrug resistance is no longer a future threat but a current reality, complicating the management of everything from common diarrheal diseases to complex surgical infections. This situation demands an urgent, coordinated international response.

6.1. Critical Interventions Needed

1. **Establish Sentinel Surveillance:** Implement a functional antimicrobial resistance (AMR) surveillance system to monitor trends and guide treatment policies.
2. **Secure Antibiotic Supply Chains:** Ensure reliable access to a range of first- and second-line antibiotics, including those reserved for resistant infections.



3. **Support Laboratory Capacity:** Rebuild and equip microbiology laboratories to enable accurate diagnosis and susceptibility testing.

4. **Promote Rational Medicine Use:** Develop and disseminate context-appropriate treatment guidelines for healthcare workers.

The lessons from Gaza represent a warning sign for other conflict-affected regions. The collapse of health systems creates a breeding ground for multidrug-resistant organisms that can transcend borders. Addressing this crisis is not only a humanitarian imperative but also a critical step in safeguarding global health security.

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