CZU: 628.19:579.68+614.777

Pollution of drinking water with microorganisms

Cristina DUMITRAS, Mihai MUNTEANU

Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

Keywords: *drinking water; microbial contamination; sanitary risks; heavy rainfall; public health.*

Introduction

Access to microbiologically safe drinking water is essential for preserving population health. However, microbial contamination continues to be a major cause of waterborne diseases, particularly in low- and middle-income countries. In some countries, disparities between rural and urban areas regarding water treatment infrastructure expose significant portions of the population to sanitary risks. The lack of modern systems for water disinfection, the proximity of drinking water sources to agricultural or sewage contamination, and inadequate hygiene practices contribute to frequent episodes of contamination. This study *aims* to investigate the extent and impact of microbial pollution of drinking water and to emphasize the need for systemic interventions.

Material and methods

A descriptive study was conducted through a comprehensive bibliographic review of full-text articles and official reports from the WHO, CDC, and national public health agencies. Data were synthesized on the main microbial contaminants in water sources, their routes of transmission, and the health effects on exposed populations. Particular attention was given to out-breaks recorded after floods, sanitation failures, and extreme weather events, which tend to exacerbate microbial water contamination.

Results

Numerous pathogenic microorganisms can be present in inadequately treated drinking water. These include bacteria (*Escherichia coli, Salmonella* spp., *Shigella* spp., *Vibrio cholerae*), viruses (norovirus, rotavirus, hepatitis A and E viruses), and parasites (*Giardia* spp., *Cryptosporidium* spp., *Entamoeba histolytica*). Transmission occurs primarily through the fecal-oral route, with contamination often resulting from infiltration of human or animal waste, poor sanitation infrastructure, and surface runoff following heavy precipitation. Microbial pollution is particularly dangerous for children under five, the elderly, pregnant women, and individuals with weakened immune systems. Recurrent diarrheal diseases, dehydration, malnutrition, and chronic intestinal disorders are frequent consequences in vulnerable groups. In rural communities relying on wells or small surface sources, contamination is often persistent due to lack of maintenance, absence of chlorination, and insufficient water quality monitoring. In the context of climate change, intense rainfall and flooding increase the load of biological contaminants in surface and underground waters. The risks are compounded by the overuse of antibiotics and the emergence of antimicrobial resistance in some waterborne pathogens. These challenges call for immediate improvements in infrastructure, surveillance, and public health education.

Conclusions

Microbial pollution of drinking water remains a critical public health issue, with serious implications for population morbidity and mortality. The protection of drinking water quality must be considered a priority in public health strategies, especially in the context of climate instability and demographic vulnerabilities.

Corresponding author:
Cristina Dumitras,
e-mail: cristina.dumitras0921@stud.umfcd.ro