

SC-21

Monitoring drinking water quality at the “Gaetano Martino” University Hospital in Messina: changes in chemical and microbiological parameters during the water supply crisis

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Background. The continuity and quality of water supply are essential requirements for patient safety in hospital settings. In urban areas subject to frequent water crises, such as the city of Messina, pressure fluctuations and flow interruptions can compromise the integrity of the internal network. This study analyzes the impact of such emergencies on drinking water quality at the “Gaetano Martino” University Hospital.

Materials And Methods. 293 samples collected from January 13, 2023, to December 17, 2025, across the different Operating Units were analyzed. The monitoring included both physicochemical and microbiological analyses to verify compliance with Legislative Decree 18/2023.

Results. Monitoring revealed a deterioration in water quality during drought periods. Conductivity, which averaged 1,269 µS/cm in 2023, showed a marked increase in 2024, reaching 2,742 µS/cm in July and a peak of 3,915 µS/cm in September and returning to compliant values in 2025. Other parameters, including hardness, calcium, magnesium, and chloride concentrations, showed substantial variations, reflecting increased mineralization associated with deep groundwater abstraction. From a bacteriological perspective, during the three-year study period, 179 samples were found to be non-compliant for Pseudomonas aeruginosa. In 2024, compared to the previous year (6.15%), the positivity rate showed a significant increase (22.8%), which was related to water stagnation.

Conclusions. The water crisis led to alterations in drinking water quality, with increased mineralization and Pseudomonas aeruginosa colonization in high-risk hospital wards. Continuous monitoring and water system management helped contain these problems, underscoring the importance of water risk management protocols in hospital surveillance to ensure patient safety during environmental emergencies.