

A Preliminary Study to Assess the Impact of Environmental Conditions on Microbiological Water Quality of Dug Wells in the Katuwawala Area, Colombo District, Sri Lanka

BDTR Dharmakeerthi¹, JMT Sandareka¹, PNS Paravithana¹, R Wickramasinghe¹,
SPNN Senadeera², and CB Ranaweera^{1#}

¹Department of Medical Laboratory Sciences, Faculty of Allied Health Sciences, General Sir John Kotelawala Defence University, Sri Lanka

²Department of Zoology and Environment Sciences, Faculty of Sciences, University of Colombo, Sri Lanka

#cbr2704@kdu.ac.lk

Groundwater from shallow wells is a primary domestic water source in Sri Lanka and many other parts of the world. However, it is often left untreated, leading to significant vulnerabilities to pathogenic contamination due to environmental and geographical conditions exacerbated by population growth, urbanization, and industrialization. These factors render groundwater and surface water quality in both urban and rural environments susceptible to pollution from natural processes and human activities. Although groundwater is not typically nutrient-rich for microorganisms, it becomes polluted by environmental factors, resulting in nutrient levels that exceed permissible limits. This contamination can cause the spread of highly infectious diseases. This study was conducted in Katuwawala, Colombo District, Sri Lanka, to assess the microbial quality of well water in relation to environmental conditions. Nineteen well water samples from eight randomly selected locations were tested for *Escherichia coli* (*E. coli*) and coliforms using the Most Probable Number (MPN) method. The study revealed that only 25% of the sampled wells adhered to safety standards for human consumption. Conversely, 50% of the wells exhibited contamination levels exceeding permissible limits. The safety status of the remaining 25% of wells could not be accurately assessed due to prevailing uncertainties. This study indicates that microbial contamination of well water is heavily influenced by inadequate well construction, proximity to sewage pits, and poor geographical conditions, with unprotected wells showing the highest contamination levels. In contrast, wells that were properly constructed and maintained a sufficient distance from potential contamination sources exhibited better microbial water quality. To mitigate public health risks, it is crucial to inform residents, promote safety precautions, and encourage regular monitoring of well water quality.

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