

ANTIMICROBIAL RESISTANCE IN RIVERS OF A RURAL COMMUNITY IN BAHIA - BRAZIL

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Abstract:

The use of antibiotics in the medical field or in raising livestock inevitably leads to antimicrobial resistance. Frequent improper disposal of these antimicrobials in aquatic environments associated with poor sanitation and inappropriate sewage treatment converts water bodies into major setting for selection of resistant bacteria, and thus a potential risk to human health. We decided to evaluate the presence of enterobacteria resistant to antibiotics in two rivers from a well-studied rural community located in Bahia – Brazil. We conducted a cross-sectional study sampling 50 mL of water at 8 points over a km long stretch of the Jiquiriçá River and its tributary, the Brejões, as well water from the local treatment plant and tap water. All of the samples showed presence of coliforms (mean 68.1 CFU) and, with the exception of the post-water treatment sites, all showed *E. coli* (mean 9.6 CFU). Based on the CLSI (2015), bacteria from all water samples showed some kind of drug tolerance. However, only four of them showed enterobacteria resistance to the evaluated antibiotics, including water from the tap water that showed *Klebsiella pneumoniae* with resistance for cefepim, ceftazidime and aztreonam. The sample that showed bacteria with the highest number of different resistances (ceftazidime, aztreonam, cefotaxim) was from the intersection of the rivers, where the highest human density is also found. Other two points displayed resistance to ciprofloxacin and one of them also demonstrated resistance to aztreonam, they were both located at the end of each of the rivers, Jiquiriçá and Brejões, respectively. None of the evaluated samples demonstrated to be ESBL positive. DNA from the samples will be evaluated by molecular biology to elucidate the resistance mechanism involved. Our results show that antimicrobial resistant bacteria can be found in natural waters and this should be monitored due to the intimate relation that humans have with aquatic environment. For the future, our plan is to investigate this resistance longitudinally correlating this with environmental and meteorological data, so we can predict the dispersion of these bacteria in the rivers and its contact with human population.

Palavras-chave: antimicrobial resistance; bacteria; enterobacteria; environment.

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