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Survey of antimicrobial use during COVID-19 and environmental implications

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Abstract

Background: The recent COVID-19 outbreak required the use of several antimicrobials in an attempt to find effective therapies. This COVID-19demanded use of several antimicrobials likely led not only to greater loads but also to a different pattern of antimicrobials in the environment. Clear understanding of the antimicrobial environmental threat requires frequent revaluation of the problem and disseminating it among relevant audiences. Thus, identifying the pandemic most used antimicrobials likely to pose environmental threat would be valuable [1,2]. **Methods:** The ambulatory and the hospitals consumption patterns of antimicrobials, during the COVID-19 pandemic (2020-2021) were compared to those of 2019. A predicted risk assessment screening approach based on exposure and hazard in the surface water was conducted, combining consumption and excretion rates endpoints in five different regions of Portugal. **Results:** Except for antimalarials, a negative consumption trend (from -2.5% to -15.0%) was observed for all antimicrobial groups over the study period. Among all antibiotics, antiviral and antimalarial used, 22 drugs showed an increased use with potential environmental concentrations compared to the pre-covid period. The microbiological risk quotient has been assessed and most of the 22 selected substances showed an elevated to moderate risk, with an impact on all regions, with flucloxacillin, piperacillin, tazobactam, meropenem, ceftriaxone, fosfomycin, metronidazole exhibiting the most significant potential to be selected for antibiotic resistance. **Conclusions:** Considering the present results, it is essential to promote monitoring of the positive risk-identified antimicrobials in the waste-surface water.

Keywords: antimicrobials; consumption; environmental risk; COVID-19

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