# Presence of Severe Acute Respiratory Syndrome-Related Coronavirus 2 (SARS-CoV-2) RNA on Particulate Matters: A Multi Central Study in Turkey

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RATIONALE: Coronavirus disease 2019 (COVID-19), which is caused by the SARS-CoV-2, has been affecting the world since the end of 2019. Turkey is severely affected with the first case being reported on March 11th 2020. Several studies suggest an association between air pollution and the spread of the infection, and that ambient particulate matters (PM) can present a potential, as virus carriers. The aim of the present study was to investigate the presence of SARS-CoV-2 RNA on ambient PM. METHODS: Ambient PM samples in various size ranges were collected from 13 sites including urban, urban background locations and hospital gardens in 10 cities including Istanbul, Ankara, Izmir, Zonguldak, Tekirdag, Eskisehir, Bolu, Bursa, Konya, and Antalya across Turkey, between 13th of May and 14th of June, 2020. The nucleocapsid (N) 1 gene and RNA dependent RNA polymerase (RdRP) gene expressions were analyzed in PM samples for the presence of SARS-CoV-2 by applying quantitative real time-polymerase chain reaction (qRT-PCR) and three dimensional (3D)-digital PCR methods. RESULTS: A total of 155 daily samples (Total Suspended Particulate [TSP], n=80; $PM_{2.5}$, n=33; $PM_{2.5-10}$, n=23; $PM_{10}$, n=19; and 6 size segregated, n=48) were collected using various samplers in the each city. According to RT-PCR and 3D-RT-PCR analysis, dual RdRP and N1 gene positivity were detected in 20 of the samples (9.8 %). The highest percentage of virus detection on PM samples was from hospital gardens in Tekirdağ, Zonguldak, and Istanbul, especially in $PM_{2.5}$ mode. Samples collected from two urban sites, Ankara and Eskisehir, were also positive. CONCLUSIONS: These findings suggest that SARS-CoV-2 may be transported by ambient particles, especially at sites close to the infection hot-spots such as hospital gardens. Whether this has an impact on the spread of the virus infection remains to be determined.

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