A long-run relationship assessment of air pollutants on rheumatoid arthritis (RA) disease activity score (DAS28): evidence from the VECM approach

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Abstract

Introduction: Current findings on the impact of air quality conditions on rheumatoid arthritis (RA) are sparse and not conclusive. This study aimed to investigate the relationship between air pollutants (O_3, SO_2, NO_2) and the disease activity scores (DAS-28) of RA patients for short and long time period.

Methods: In this paper, a multivariate time series approach using Evidence from vector error correction model (VECM) employed to investigates the effects of air ambient pollutants (O_3, SO_2, NO_2) emissions on RA disease activity score (DAS28) in Kuwait over the period of 2013–2020. Data on RA patients were extracted from the Kuwait Registry for Rheumatic Diseases (KRRD).

Results: According to the Granger causality test and VECM, the emissions of nitrogen dioxide (NO_2), and ozone (O_3) have a positive short-term effect on DAS28 among RA patients in Kuwait. Impulse response test results show that for some locations in Kuwait there is a short-term positive causal relationship between emissions of $ NO_2 $ and DAS28, due to sources of pollution surrounding the location, while emissions increased in NO_2 and O_3, they inhibit the DAS28 in patients with RA in Kuwait.

Conclusion: There is a long-term cointegration relationship between air pollutants and DAS28. Air pollutants level may predict disease activity in RA patients and a warning for RA patients may be issued according to the forecast status.

Keywords *Air pollution,* DAS-28*, Cointegration, ¨Long-run relationship¨ ,Kuwait*

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