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**Title:** Factors affecting physical activity in patients with air pollution-related illness compared to patients with COPD

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**Body:** Background: The survival of chronic obstructive pulmonary disease (COPD) patients has been reported to be associated with physical activity (PA). However, there have been no reports concerning PA in patients with air pollution-related illness (API), who have symptoms of dyspnea similar to COPD patients. Objective: We investigated the factors affecting PA in patients with API compared with COPD patients. Methods: The study subjects were 30 patients with API and 38 COPD patients. The MRC dyspnea scale (MRC), pulmonary function, muscle strength, six minute walking test (6MWT), incremental shuttle walking test (ISWT), ADL score, SGRQ, CES-D and PA were measured. PA was assessed using a multisensor accelerometer that records steps and energy expenditure for 7 consecutive days after admission for pulmonary rehabilitation. An analysis was performed to examine the differences between the two groups in order to identify the factors that influence PA in patients with API. Results: Patients with API had significantly better pulmonary function compared with COPD patients ( $p < 0.001$ ). However, their leg strength, exercise tolerance and QOL were significantly worse ( $p < 0.01$ ), and a higher incidence of depression symptoms were seen in patients with API ( $p < 0.05$ ). On the other hand, the differences of MRC and PA were not significant between the two groups. PA of patients with API was correlated with the MRC, %VC, ISWT and ADL score, while PA of COPD patients was correlated with age, MRC, BMI, 6MWT, ISWT and ADL score. Conclusions: To improve MRC, ISWT and ADL that influence PA, pulmonary rehabilitation as well as other treatments may therefore be useful in treating patients with API.