

## 4 Physical activity patterns and clusters in 1001 patients with COPD

*Physical activity levels in chronic obstructive pulmonary disease (COPD) have been mostly presented as an average of multiple measurement days. However, physical activity is a multi-dimensional construct, which means that it should be described by relevant descriptors and components beside its total amount. We described physical activity measures and hourly patterns in patients with COPD after stratification for generic and COPD-specific characteristics, and, based on multiple physical activity measures, we identified clusters of patients. 1001 patients with COPD were studied cross-sectionally. Daily physical activity measures and hourly patterns (i.e., a graphic representation of the mean intensity of activity per hour during the course of a day) were analysed based on data from a multi-sensor armband. Principal component analysis (PCA) and cluster analysis were applied to physical activity measures to identify clusters of patients with COPD. Age, body mass index (BMI), dyspnoea grade, ADO index (including age, dyspnoea, and airflow obstruction), sex, long-term oxygen therapy use, lung diffusion capacity, and GOLD classification were associated with physical activity measures in patients with COPD ( $P < 0.05$  for all), but only the first four were associated with hourly patterns. Five clusters were identified based on three PCA components, which accounted for 60% of variance of the data. Importantly, cluster 1 (i.e., the most inactive patients) was characterized by higher BMI, lower FEV<sub>1</sub>, worse dyspnoea and higher ADO index compared to other clusters ( $P < 0.05$  for all). Daily physical activity measures and hourly patterns are heterogeneous in COPD. Clusters of patients were identified solely based on physical activity data. These findings may be useful to develop interventions aiming to promote physical activity in COPD.*