

4.5 Detailed Analyses of the Components Identified in the PCA

A detailed analysis of the relationship between the three components identified by PCA and the five clusters identified from these components is provided in the following paragraphs.

The first component was clearly able to discriminate clusters 1 and 2 (the most inactive clusters) from the three other clusters (clusters 3, 4 and 5) (Figure 23B and C). The second component was not really useful to identify more inactive patients (clusters 1 and 2), but was able to discriminate the most active cluster (cluster 5) from the rest (Figure 23B and D). For discriminating clusters 3 and 4 from the others it is important to consider the combination of the three components. Indeed, if only the first component was considered, for instance, these clusters would be added to the most active cluster (cluster 5) (Figure 23B and C). On the other hand, if only the second component was considered these clusters would be added to the inactive clusters (i.e., clusters 1 and 2) (Figure 23B and D).

Having a closer look at the most relevant features of each component we can notice that the first component is related to the time spent in bouts of very light intensity, whilst the second component is related to the total daily EE in activities of moderate-to-vigorous intensity, mostly in bouts of physical activity. Therefore, it can be suggested that the time in bouts of moderate-to-vigorous intensity can be a useful marker to discriminate patients who are very active from the others.

4.6 Discussion

The present study provides detailed analyses of objectively measured physical activity in a multinational sample of 1001 patients with COPD. The principal findings show that daily physical activity measures and hourly patterns vary considerably after stratification for generic and COPD-specific characteristics; and that patients with COPD can be clustered based on daily physical activity measures, with five clusters being identified, each with distinct physical activity measures and hourly patterns.

4.6.1 Daily Physical Activity Measures and Physical Activity Hourly Patterns in COPD

Our results clearly show that physical activity is a heterogeneous characteristic in patients with COPD, corroborating previous findings [83, 17]. Distinct levels of physical activity were found after stratification for age ($<$ or \geq 67 years), sex (male vs. female), BMI (underweight to obese), mMRC dyspnoea grade (0 to 4), LTOT (yes or no), DLCO ($<$ or \geq 51% predicted), ADO index ($<$ or \geq 4 points), GOLD grades (1 to 4) and GOLD groups (A to D) (Table XX-Table XVIII in the appendix). Interestingly, comparable time in very light and moderate-to-vigorous intensities was found between GOLD groups A and C, and between GOLD groups B and D (Table XXVIII in the appendix). This suggests that symptoms of dyspnoea, which discriminates between groups A/C and B/D, are better associated with physical activity measures than the degree of airflow