



Figure 2 COPD vicious cycle.

## 1.2 Problem statement

There are several treatment strategies to improve physical activity and break the vicious cycle of deconditioning that affects patients with COPD such as pharmacological therapy, ambulatory oxygen therapy, and pulmonary rehabilitation programs. Pulmonary rehabilitation is recognized as a core component of the management of individuals with chronic respiratory disease and it has taken a lead in implementing strategies for health behaviour change and to optimize and maintain patient's outcomes [14]. However, with the growth in healthcare staffing shortages and healthcare costs, patients should also be empowered to take a more active role in their personal health management and being able to perform, for example, physical training on their own, in addition to the supervised training with a therapist. It is therefore essential to develop new technologies and service concepts that permit COPD management at home, complementary to the interventions in healthcare centres. User feedback or even personal coaching might help a patient to adjust his lifestyle to the requirement of his health [15]. While systems for health monitoring and patient support are of great interest to both care providers and patients alike, suitable frameworks to achieve the envisioned paradigm shift from managing COPD patients in the hospital towards the home environment are currently lacking and require, among other challenges, the development of systems and metrics to assess patient training, behaviour, and disease stage.

Moreover, although the scientific foundation regarding the clinical importance of assessing and improving physical activity in patients with COPD has grown considerably in the past decade, the effects of the actual treatment strategies to increase and maintain physical activity have yielded inconsistent results [16]. The factors associated with patient's capability to engage in daily physical activity are currently not well established, which may limit the impact of physical activity enhancement interventions [17]. Despite the widespread acknowledgement of this problem, further understanding is needed regarding the concepts for optimizing the impact of interventions that aim to maintain or increase physical activity levels in patients with COPD. This