

# Personalizing Self-Management Interventions in COPD – Looking Beyond One-Size-Fits-All

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Owing to the growing number of patients with chronic obstructive pulmonary disease (COPD),<sup>1</sup> there is a high demand for evidence-based self-management interventions to manage care and promote behavioral change to improve health outcomes.<sup>2</sup> COPD self-management interventions are structured, but personalized and often multi-component, with goals of motivating, engaging, and supporting patients to positively adapt their health behavior(s) and develop skills for better disease management.<sup>3</sup> As COPD is a heterogeneous disease, not all intrapulmonary and extrapulmonary components characterizing COPD are present in each individual at any given time.<sup>4</sup> Consequently, there is a diversity in individual patient needs, and there is no “one-size-fits-all” approach for COPD care and management. Personalization of self-management interventions in COPD is therefore imperative to increase the probability that patients will actually improve their health behavior and strive for optimal disease management. In this editorial, we highlight important components of effective self-management interventions in COPD: 1) a patient-tailored approach; 2) adherence; 3) digital technology; and 4) implementation.

## Patient-Tailored Approach

The heterogeneity and complexity of COPD call for patient-tailored self-management interventions, considering, for example, individual characteristics, symptoms, and comorbidities. For this, Cazzola et al<sup>4</sup> suggest using a personalized treatable traits approach, with traits identified based on individual characteristics. This approach recommends considering the patient as a whole, identifying the key factors underlying each patient’s disease that may require an approach that differs from standard guidelines or recommendations, to create and implement an individualized management plan.<sup>4</sup> Although the treatable traits approach is already applied following the GOLD strategy, with recommendations of follow-up treatment based on the key treatable traits of persistent dyspnea and exacerbations,<sup>1</sup> its application is complicated because potentially treatable traits span the pulmonary (eg, dyspnea, emphysema), extrapulmonary (eg, anxiety, overweight), and behavioral/risk factor (eg, suboptimal inhaler technique or adherence, smoking) domains.<sup>4</sup> Since treatable traits can coexist in the same patient and change over time, a problem with this approach is that patients must be monitored over time to focus therapy on each individual patient’s temporal needs.<sup>4</sup>

Monitoring patients for highly prevalent, well-known risk factors could provide better insights into individual patient traits such as symptoms, exacerbation risk, comorbidities, and need for support in self-management, to timely offer appropriate self-management strategies. For example, Jacobson et al<sup>5</sup> show that on a group level, mucus worsening is an important COPD symptom to monitor, to detect COPD exacerbations early and predict future exacerbations. There is also an important role for biomarkers, particularly eosinophils, in managing exacerbations. Blood eosinophil-guided prednisolone therapy has shown to be non-inferior to standard care while reducing systemic glucocorticoid exposure, emphasizing the need to identify inflammatory endotypes during exacerbations.<sup>6</sup> Also, the use of antibiotics in COPD

self-management may benefit from biomarker guidance, particularly in differentiating bacterial from non-bacterial exacerbations to mitigate antimicrobial resistance.<sup>7</sup> However, owing to the in-person variability of exacerbation endotypes and blood eosinophil count as a threshold to guide steroid treatment,<sup>8</sup> both have to be tested at every new exacerbation before patients can start adequate self-treatment.<sup>6,7</sup> The potential for near-patient (eg, at home or in a shared care facility) testing, such as integrating patient-friendly point-of-care eosinophil tools, is significant as this would ensure timely and appropriate COPD treatment initiation without delaying care.<sup>7</sup> Such advances could streamline self-management and self-treatment strategies in COPD, ensuring alignment with exacerbation endotypes.

Another important aspect that can severely complicate disease management is multimorbidity in COPD due to shared risk factors (eg, smoking, inactivity), overlapping symptoms (eg, acute dyspnea), and comorbidities (eg, feelings of anxiety), triggering COPD exacerbations. An explorative study by van Dijk et al<sup>9</sup> shows a variety of multimorbid disease patterns in COPD patients with chronic heart failure, anxiety, and/or depression, arguing for personalized, yet multi-disciplinary disease management. After further validation, the observed repetitive patterns within patients may be used as a starting point to further tailor disease management to each patient.<sup>9</sup> For example, providing COPD patients with more insights into their multimorbid disease patterns may facilitate timely symptom recognition and appropriate self-management of their disease(s). In addition, ongoing healthcare professional (HCP) support and feedback regarding individual disease patterns may improve adherence to self-management strategies, and ultimately improve health outcomes in COPD patients with multimorbidity.

## Adherence

Adherence of COPD patients to medical therapies, including self-management interventions, is unsatisfactory, with often not even half of the patients being adherent.<sup>1,10</sup> Patient adherence is necessary for treatment success and can be influenced by structural, social, disease-related, and psychological factors, such as the healthcare system, ethnicity, literacy and numeracy, understanding of health concepts, and health beliefs.<sup>11</sup> A 2023 study by Bischoff et al<sup>12</sup> evaluates a mobile health (mHealth) application for self-management of acute exacerbations of COPD, and reports a positive association between patient adherence and COPD exacerbation self-management behavior, self-efficacy, and disease acceptance. Choi and Ryu<sup>13</sup> describe, in their Delphi study including experts and patients, negative associations of patient adherence to self-management interventions with factors such as prolonged treatment, experience of treatment failure, and unknown effects of medication. Cazzola et al<sup>4</sup> consider adherence as a treatable trait that can be targeted for treatment. Tailoring interventions to overcome individual barriers along with the inclusion of facilitating factors is likely to increase intrinsic motivation to change behavior, including adherence, and subsequently health outcomes. Further research is needed to develop intervention strategies based on factors associated with (non-)adherence to COPD self-management interventions.<sup>13</sup>

## Digital Technology

As illustrated in research by Bischoff et al,<sup>12</sup> Te Braake et al,<sup>14</sup> and Taylor et al,<sup>15</sup> digital technologies are increasingly being used in COPD self-management interventions to support education (web applications), health communication (eg, teleconsultation), remote monitoring (eg, wearables, electronic symptoms diary), self-treatment (eg, digital action plans), and decision making (clinician dashboard). Digital tools may improve patient empowerment, confidence, and adherence to self-management strategies, and facilitate the use of complex decision models for guiding treatment, optimizing self-management, and ensuring the accessibility of advanced biomarker testing in everyday clinical practice.<sup>7</sup> This could even be further improved by making them more attractive, rewarding, and safe.<sup>16</sup> Digital COPD applications have the potential to provide better insights into the daily life of an individual COPD patient by using real-time data (eg, symptom data) that can be used for individual risk and benefit profiling, and guide (shared) decision making to provide appropriate personalized care and support. For example, based on risk predictions and individual goal setting, a digital COPD self-management tool, as used in the study by Bischoff et al,<sup>12</sup> could provide personalized advice regarding the use of bronchodilators, breathing techniques, coughing techniques, how to distribute energy, when to contact an HCP for support, and when to initiate self-treatment of COPD exacerbations or flare-ups of comorbidities. Although Bischoff et al<sup>12</sup> indicate that it is important for patients that digital interventions add value to their regular contacts with HCPs,

evidence is lacking regarding characteristics associated with patients' perceived effectiveness and utilization of digital interventions. Therefore, prior to any implementation of digital self-management interventions in COPD, it is key to first evaluate which components of digital tools are most valuable to patients and how these can be optimally patient tailored, so that more patients will benefit.

## Implementation

The implementation of COPD self-management interventions in healthcare systems is suboptimal.<sup>17</sup> Known organizational barriers to adopting self-management interventions are time, necessity for professional skills development, and overcoming negative perceptions of these interventions.<sup>18</sup> Effective implementation of self-management interventions needs a whole-system approach, with a combination of active patient engagement, and training and motivation of HCPs working in an organization that values the intervention.<sup>19</sup> Leemans et al<sup>20</sup> highlight, in their 2023 paper, that integrated care of non-pharmacological treatments may not be well implemented owing to the obstacles in interprofessional collaborations. Ingenhoff et al<sup>21</sup> underline, in addition, the importance of evidence-based, localized approaches and the presence of continuous funding in achieving a sustainable infrastructure for interventions. Overall, further implementation research is necessary to direct the implementation of self-management interventions on a larger scale.

The implementation of self-management interventions with digital technology is even more complicated. Whereas the use of digital technology may be a facilitator for some, it could be a barrier for others, especially for those with a lower sense of technological self-efficacy and difficulties in interpreting and acting upon device readings.<sup>22</sup> Te Braake et al<sup>14</sup> highlight the importance of providing self-management training for both patients and HCPs before introducing technology, so that all can be prepared and equipped for patients to take an active role in their disease management. When incorporating digital technology, it is important to: 1) tailor it to the patient's digital literacy and skills; 2) ensure accessibility and inclusivity; 3) optimize digital engagement and perceived usefulness for both patient and HCP; 4) ensure that digital healthcare solutions are safe to use; and 5) avoid self-management overload for both patient and HCP because of intensive monitoring.<sup>22,23</sup>

## Conclusion

Thus, to successfully embed self-management interventions in the care and management of patients with COPD requires multidisciplinary management that is evidence based, but above all patient tailored, as interventions should be responsive to the (changing) needs of the individual patient with COPD. Personalization of self-management interventions in COPD should be further developed using a personalized treatable traits approach to treat the patient as a whole, based on individual characteristics, symptoms, and comorbidities. In addition, overcoming individual barriers and enhancing facilitators for patient adherence to self-management interventions are expected to increase the motivation to change patients' behavior and adherence. Furthermore, digital technologies have great potential to support COPD patients in the self-management of their disease(s) through the use of remote monitoring to obtain insights into patients' daily life and guide (shared) decision making to provide appropriate personalized care and support. To optimize the implementation of (digital) self-management interventions in COPD, it is important that patients perceive these interventions as adding value to their regular care. To achieve this, self-management interventions should ideally be tailored to individual patients' needs, health beliefs, capabilities, skills, and (digital) literacy levels, and, in addition, be accessible, inclusive, and safe to use.

## Disclosure

The authors report no conflicts of interest in this work.

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