



# ERS International Congress 2022: highlights from the Allied Respiratory Professionals Assembly

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## Shareable abstract (@ERSpublications)

This article provides a brief overview of some of the outstanding sessions that were (co)organised by @ERS\_Assembly9 (Allied Respiratory Professionals) during #ERSCongress 2022 <https://bit.ly/3TBbV6K>

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## Abstract

In this article, we provide a brief overview of some of the outstanding sessions that were (co)organised by the Allied Respiratory Professionals Assembly during the 2022 European Respiratory Society International Congress, which was held in a hybrid format. Early Career Members from Assembly 9 summarised the content of the sessions, with the support of the Officers from the four Assembly groups: Respiratory Function Technologists and Scientists (Group 9.01); Physiotherapists (Group 9.02); Nurses (Group 9.03); and Psychologists and Behavioural Scientists (Group 9.04). The sessions covered the following topics: recent advances in cardiopulmonary exercise and challenge testing; the role and new trends in physiotherapy, exercise and physical activity promotion interventions in chronic respiratory diseases; development of the international curriculum for respiratory nurses and nursing aspects in disease management; and treatment adherence, e-health interventions and post-coronavirus disease 2019 challenges. This Highlights article targets delegates who attended the Congress sessions, as well as those who were unable to attend, and provides valuable insight into the latest scientific data and emerging areas affecting the clinical practice of Allied Respiratory Professionals.

## Introduction

The European Respiratory Society (ERS) International Congress is an annual event that brings together thousands of experts from around the world to present and discuss the latest scientific and clinical advances in the respiratory field. In 2022, the ERS Congress took place in a hybrid format (Barcelona, Spain and online) and provided the Allied Respiratory Professionals with a wide range of outstanding sessions (co)organised by Assembly 9.

In this article, the four groups from the Assembly highlight some of the sessions presented at the ERS Congress 2022. Early Career Members (including respiratory function technologists and scientists, physiotherapists, nurses, and psychologists and behavioural scientists) summarise the latest scientific and clinical insights presented in five oral presentation and two thematic poster sessions: one session on recent



advances in cardiopulmonary exercise and challenge testing; two sessions on new trends in physiotherapy, exercise and physical activity (PA) promotion interventions in chronic respiratory diseases; one session on the development of the international curriculum for respiratory nurses; two sessions on nursing aspects in disease management; and one session on the best abstracts from psychologists and behavioural scientists. Summaries of the sessions with important take-home messages are provided.

### Group 9.01: respiratory function technologists and scientists

#### *Cardiopulmonary exercise and challenge testing: utilisation and safety implications*

This session included seven oral presentations that covered recent advances and current perspectives concerning the clinical application of cardiopulmonary exercise testing (CPET) and direct bronchial provocation *via* histamine and methacholine.

#### *Clinical application of exercise testing*

CPET is an important clinical tool with an established role in the diagnosis and management of chronic lung disease [1]. MCARTHUR *et al.* [2] presented findings concerning the safety and accuracy of a recently established physiologist-led CPET service. In total, 579 CPETs were conducted in 1 year, with almost one third (n=188) performed by physiologists. Of these, none of the tests required medical attention. Importantly, following training, physiologists felt competent at conducting the CPET autonomously, and adopting this approach saved approximately 282 h of annual consultant time.

Blibech and colleagues evaluated the predictive value of CPET on surgical outcomes in patients undergoing lung resection surgery in Tunisia [3]. In this study, post-operative complications were associated with higher age, smoking history and minute ventilation/carbon dioxide production ( $V'_E/V'_{CO_2}$ ) slope, and lower forced expiratory volume in 1 s (FEV<sub>1</sub>), maximum oxygen consumption ( $V'_{O_{2max}}$ ) and oxygen pulse. The authors concluded that  $V'_{O_{2max}}$  and  $V'_E/V'_{CO_2}$  are important CPET parameters that should be included as part of functional evaluation risk stratification algorithms to guide lung resection surgery referral pathways.

RATH *et al.* [4] assessed the effects of expiratory flow limitation during tidal breathing (EFL<sub>T</sub>) on lung function, exercise limitation and symptom perception in 86 patients with stable COPD (male n=83; age 64±9 years; body mass index (BMI) 22.4±4.2 kg·m<sup>-2</sup>). Respiratory impedance was measured *via* forced oscillometry, and small airway dysfunction was defined as either whole-breath reactance at 5 Hz ( $X_5$ ) less than the lower limit of normal, and/or difference in resistance at 5 and 19 Hz ( $R_{5-19}$ ) more than the upper limit of normal. The sample was stratified into two subgroups: 1) COPD with EFL<sub>T</sub> and 2) COPD without EFL<sub>T</sub>. The authors observed no difference between groups for modified Medical Research Council score, COPD Assessment Test (CAT) score or 6-min walk test (6MWT) distance (p>0.05). However, the fall in oxygen saturation measured by pulse oximetry ( $S_{pO_2}$ ) and increase in Borg dyspnoea scores during the 6MWT were higher in COPD with EFL<sub>T</sub> (p<0.05).

ONG-SALVADOR *et al.* [5] explored whether transcutaneous carbon dioxide ( $P_{tcCO_2}$ ) is a reliable alternative to partial pressure of carbon dioxide in arterial blood ( $P_{aCO_2}$ ) and whether  $P_{tcCO_2}$  can distinguish between hypercapnia and hypocapnia during exercise. CPETs with arterial blood gases (ABG) (n=124 patients; male 44%; age 56±68 years) were divided into three subgroups: ABG at rest (n=65), ABG at peak exercise (n=112), and ABG at rest and peak exercise (n=53). The authors observed no significant differences and reported a strong linear correlation between  $P_{tcCO_2}$  and  $P_{aCO_2}$  at rest and peak exercise; however, the  $P_{tcCO_2}$  in isolation failed to discern between hypercapnia and hypocapnia during CPET.

VESTENG *et al.* [6] presented data from a retrospective study comparing the agreement between oxygen saturation measured *via*  $S_{pO_2}$  during 6MWT *versus* arterial oxygen saturation ( $S_{aO_2}$ ) during a CPET. In total, 70 patients with chronic lung disease (male n=40; age 61±13 years) were included. No difference was observed at rest between  $S_{pO_2}$  and  $S_{aO_2}$  (p=0.133); however, the saturation was significantly lower for  $S_{pO_2}$  when comparing nadir values (*i.e.* the lowest measure of saturation obtained throughout the tests) (p=0.042). The authors concluded that an indirect measure of  $S_{pO_2}$  during a 6MWT may overestimate desaturation when compared to direct measures of  $S_{aO_2}$ , although  $S_{pO_2}$  appears to capture clinically relevant desaturation.

#### *Challenge tests: direct bronchial provocation via histamine and methacholine*

DE VREEDE [7] conducted a retrospective analysis of histamine provocation tests to determine factors impacting post-challenge recovery. The study population (569 patients with a post-challenge 10% decline in FEV<sub>1</sub>) were randomly matched and divided into two subgroups: 1) insufficient recovery following the administration of 400 µg salbutamol (n=94) (defined as >10% change in FEV<sub>1</sub> from baseline), and 2) sufficient recovery (n=94) (defined as <10% change in FEV<sub>1</sub> from baseline). In those classified as insufficient recovery, 79 had a high BMI. Logistic regression indicated an explanatory power of 27.9% of

insufficient recovery based on gender and BMI, and the probability of insufficient recovery increased by 11.8% in those with a BMI  $\geq 25 \text{ kg}\cdot\text{m}^{-2}$  ( $p < 0.01$ ). Based on these findings, the authors suggested that gender and BMI should be considered when interpreting the recovery response to histamine provocation tests.

The study from STEENBRUGGEN and DE LAAT [8] evaluated the safety of the quadruple 1-min protocol using the tidal volume methacholine challenge [9]. Methacholine challenge tests were conducted and “extreme falls” in FEV<sub>1</sub> were defined as >20% fall in FEV<sub>1</sub> following the initial dose or >30% fall in FEV<sub>1</sub> after any subsequent dose. In total, 339 tests were conducted, and of these, only four (1.2%) patients had a >20% fall in FEV<sub>1</sub>. Specifically, three patients fully recovered 15 min post 400 µg salbutamol, with one patient within 10% of baseline. Full recovery was also observed in the two patients (0.6%) experiencing >30% fall in FEV<sub>1</sub>. Despite the low number of cases, the findings from this study support the concept that the quadruple 1-min protocol using the tidal volume methacholine challenge is a feasible and safe procedure for adults when conducted by experienced physiologists.

#### Take-home messages

- CPET is safe and well-tolerated by people with chronic lung disease. Parameters such as  $V'_{O_{2\max}}$  and  $V'_E/V'_{CO_2}$  may be useful to assess the functional status of patients considered for lung resection surgery.
- Expiratory flow limitation is related to reduced pulmonary function, increased dyspnoea scores and a significant fall in  $S_{pO_2}$  during exercise.
- $P_{tcCO_2}$  in isolation does not appear to discern between hypercapnia and hypocapnia during CPET.
- $S_{pO_2}$  captures clinically relevant desaturation, although it may overestimate desaturation when compared to direct measures of  $S_{pO_2}$ .
- Gender and BMI should be considered when interpreting the recovery response to histamine provocation tests.
- The quadruple 1-min protocol using the tidal volume methacholine challenge is safe and feasible when conducted by experienced physiologists.

### Group 9.02: physiotherapists

#### *New trends in exercise, physical activity and behavioural changes in COPD, interstitial lung disease and asthma*

Discovering new ways to improve pulmonary rehabilitation (PR) and PA access and outcomes is a research priority [10–12]. This oral presentation session provided new insights into current interventions and measures used in respiratory diseases.

To improve PR access [10], new intervention models have been emerging. OLIVEIRA *et al.* [13] conducted a Delphi study to achieve consensus on the essential outcomes of rapid access rehabilitation for acute exacerbations of COPD (AE-COPD) [13]. The key components identified, *i.e.* eligibility and timeline, treatment priorities, programme design, outcomes and measures and referral and uptake, provide the foundation for developing interventions to optimise access to PR in AE-COPD. WUYTS *et al.* [14] compared the effects of a hybrid PR programme with a conventional programme in stable COPD. After PR, significant improvements were observed in both groups in exercise capacity, muscle strength and dyspnoea ( $p < 0.05$ ). The authors concluded that this hybrid PR programme seems to be effective by increasing patients’ accessibility [10, 15–19].

Physical inactivity is associated with poor health outcomes in chronic respiratory diseases [20–25]. Therefore, increasing PA in these populations is imperative. MARKLUND *et al.* [26] explored individuals’ perceptions when using an e-health tool to promote PA in COPD. For participants, the tool provided individual support and feeling of control, which highlights its relevance to maintain/increase PA levels. BREULS *et al.* [27] compared the effects of a 12-week telecoaching intervention for PA promotion with usual care in interstitial lung disease (ILD). After 12 weeks, no significant differences were observed between groups in PA. Therefore, the authors recommended PA promotion interventions with direct supervision or social support to increase PA in ILD. PAIXÃO *et al.* [28] explored the feasibility of a home-based PA programme (iLiFE) in ILD. iLiFE showed to be feasible and safe, presenting high adherence and potential to improve many health domains, such as PA. In asthma, Carvalho-Pinto and colleagues found that an 8-week behaviour change intervention aimed to increase PA in daily life significantly improved patients’ PA levels, sleep quality and asthma-related and anxiety symptoms when compared to usual care [29].

The emerging evidence to develop new PR models [10] highlights the need for simple, interpretable and meaningful measures. RODRIGUES *et al.* [30] used clustering to identify COPD subgroups according to their

performance on several functional status measures (6MWT, 1-min sit-to-stand (1-minSTS), handgrip, and quadriceps muscle strength). The four clusters that were found according to the achievement of 70% of predicted in these measures were 1) non-achievers, 2) partial achievers, 3) achievers and 4) overachievers. These clusters may guide tailored interventions to improve patients' functional status [31]. Finally, QUADFLIEG *et al.* [32] explored the applicability of the 1-minSTS to predict post-operative complications in lung cancer and showed that a cut-off of 22 repetitions and 59% predicted in the 1-minSTS could discriminate between patients with and without post-operative complications.

#### Take-home messages

- New models of PR, such as rapid access rehabilitation and hybrid delivery, have been shown to increase patients' access and accessibility to PR in acute and stable COPD.
- e-Health tools, PA promotion and behaviour change interventions (with direct supervision) might be a good solution to improve PA levels in chronic respiratory diseases.
- Functional status measures, including 6MWT and 1-minSTS, can help cluster individuals with COPD and discriminate post-operative complications in lung cancer.

#### Challenges in respiratory physiotherapy assessment and management

This oral presentation session provided a round-up on challenges regarding physiotherapy assessment and management of patients with chronic respiratory disorders, post-coronavirus disease 2019 (post-COVID-19) and under mechanical ventilation in the acute or home settings.

The study of SOUTO-MIRANDA *et al.* [33] showed that sex-related differences exist in treatable traits among patients with COPD. Most traits were more prevalent in women than men in patients referred to secondary and tertiary care, with differences being more extensive in tertiary care.

TANGUAY *et al.* [34] presented their newly developed reference equations for quadriceps strength, endurance and power that explained 50% to 70% of the total variance in quadriceps functions in healthy individuals. Percentage of predicted values for quadriceps muscle function based on these reference equations correlated weakly to moderately with the 6MWT and 1-minSTS performance in patients with COPD, which supports the construct validity of the equations in this population.

COVID-19 has also an impact on exercise capacity, PA and respiratory muscle function. DICIOLLA *et al.* [35] showed that fatigue was clinically relevant and could be an explaining factor of a lower performance in exercise capacity (measured by 6MWT and 1-minSTS) in post-COVID-19 patients at 12 months after discharge. ARENTS *et al.* [36] objectively measured PA in 49 post-COVID-19 patients at 12 months after hospital discharge. From these, 67% were low active (*i.e.* <7500 steps per day) and their PA levels were positively associated with 6-min walking distance. Post-COVID-19 patients might need to be coached to a more active lifestyle to meet the guidelines [37]. LIMA SOUZA SALDANHA *et al.* [38] found that, in a cohort of 269 post-COVID-19 patients with persistent symptoms of dyspnoea and fatigue, 32% had inspiratory muscle weakness which was also associated with a lower handgrip strength.

Managing patients on invasive and non-invasive home mechanical ventilation (HMV) is challenging, in terms of the availability of healthcare professionals at home and cost of care. Telemonitoring of HMV may be a solution, as it allows a clinical coordinator specialised in mechanical ventilation to remotely follow the HMV data and reach out to the clinical staff who are assisting patients at home for case discussions, corrective actions and follow-up. A study presented in this session showed that telemonitoring of HMV led to better quality of the service provided by homecare providers and was associated with clinical improvement and 45% reduction in the cost to manage patients on HMV [39].

#### Take-home messages

- Healthcare providers should be aware of sex-related differences in treatable traits among patients with COPD.
- New reference equations for quadriceps strength, endurance and power that explain 50% to 70% of the total variance in quadriceps function in healthy subjects are available, and these measures seem valid in patients with COPD.
- COVID-19 has long-term impact on PA, exercise capacity and respiratory muscle function.
- Telemonitoring of HMV may lead to clinical benefits and cost reduction.

### Group 9.03: nurses

#### *Development of the international curriculum for respiratory nurses: perspectives and needs*

This oral presentation session highlighted the perceived need for the development and implementation of the international core curriculum for respiratory nurses (ICCRN) on a global scale. Leading nurses, on behalf of their national associations, stated their support for the undergoing International Coalition for Respiratory Nursing (ICRN) project.

#### *Examples of good practice*

The introduction of the clinical nurse specialists and advanced nurse practitioner's role is one of the most significant changes in nursing practice in Ireland in recent years. The study from MURRAY [40] suggested that specific education in the respiratory field enhances nursing professionalisation. STRIDSMAN *et al.* [41] presented the nursing education plan in the respiratory field in Sweden and highlighted that specialised nurses are the bridge between healthcare and the society. The courses are designed with a person-centred approach with focus on self-management, interprofessional collaboration and evaluation of treatment adherence. DOS SANTOS CASTRO PADILHA *et al.* [42] highlighted that rehabilitation nursing in Portugal underpins the development of specialised nursing skills to support respiratory patients to enhance self-care and self-management behaviours, to maintain activity tolerance and integration into society. The authors believe that the ICRN project will underpin the definition and harmonisation of educational standards towards recognising nurses' certification worldwide, with the support from Portuguese Order of Nurses and the Portuguese Association of Rehabilitation Nurses. On behalf of the Association of Respiratory Nurse Specialists (ARNS), HESLOP-MARSHALL *et al.* [43] announced that the ARNS joined the ICRN, with the aim of advocating for respiratory nursing, promoting excellence in practice and influencing respiratory nursing health policies.

#### *Obstacles in nursing education in respiratory care*

ROBERTS *et al.* [44] showed a significant variation in the provision of respiratory education in UK pre-registration nursing programmes. They reported low levels of final year nursing student confidence in key respiratory knowledge and skills, and recommended these to be embedded in the curricula. Examples of limitations in areas of nursing training in Croatia were presented by Sajnic and colleagues [45, 46]. Pressing problems in nursing are the lack of nurses, underpayment, uneven key contents in the curricula of graduate studies, non-recognition of higher education, and nursing as an independent profession in the society [47]. A similar situation was reported by ÇEVİK AKYIL *et al.* [48] in Turkey. The authors referred to the lack of specific educational programmes in respiratory nursing and rising numbers of nurses quitting their jobs due to working conditions and highlighted that the only way to improve respiratory patient outcomes and nurse job satisfaction is having worldwide standardised education and recognised certification programmes through the development of an ICCRN [48].

#### *New steps towards harmonised nursing education in respiratory care*

NARSAVAGE *et al.* [49] presented a cross-sectional survey that was designed to identify the current curricula in European Union (EU) and non-EU countries and the need for an ICCRN. Survey results confirmed a wide variation in nursing education and respiratory nursing education across the world, with many countries lacking formal educational programmes in this field and 97% reporting a need for an ICCRN. To advance this significant work, the ICRN group led by A. Šajnić and supervised by G. Narsavage plans to conduct a Delphi study to identify core curriculum requirements for respiratory nursing education at pre-registration and advanced educational levels to meet each country's specific educational requirements for recognition of respiratory nursing speciality practice [50]. Following HERMES methodology guidelines [51], SAJNIC *et al.* [52] presented the steps of the ICRN project: in 2020 experts were identified, the ICRN working group registered the Scoping Review Protocol [53], and the items obtained from this protocol will be included in the first online Delphi survey. Acting on findings, a consensus document for the core curriculum will be published.

#### *Take-home messages*

- The development of an international curriculum for respiratory nursing will provide more effective and safer delivery of care to respiratory patients around the globe.
- Under the leadership of the ERS nurses' group Chair, an ICRN was formed after the ERS International Congress 2020 for the development of a harmonised syllabus and curriculum for respiratory nurses, thereby responding to the need for harmonised respiratory nursing education on a global scale.

### *Nursing aspects in asthma and COPD: self-management and pulmonary rehabilitation*

This oral presentation session included eight presentations that highlighted the importance and effectiveness of nursing-led non-pharmacological interventions in PR programmes for patients with asthma and/or COPD. It also addressed the negative effects of the lockdown on patients' quality of life and the benefits from led telenursing consultations during the COVID-19 pandemic. Below we present their main results.

REZELJ *et al.* [54] concluded that the results of the Asthma Control Test (ACT) and the Severe Asthma Questionnaire (SAQ) in severe asthma patients after bronchodilators (n=80) were significantly correlated ( $p < 0.0001$ ). MIRANDA VALLADARES *et al.* [55] showed a significant improvement of quality of life in a retrospective study with COPD patients who received nursing non-pharmacological interventions: 1) 8-week PR (including cardiorespiratory and muscular training), 2) PA promotion (with implementation of exercise routines) and 3) therapeutic education (focused on the pathophysiology of the disease and the foundations of the therapeutic regimen).

REFSGAARD IVERSEN *et al.* [56] investigated the effect of affiliation with a cross-sectorial lung team (CLT), consisting of respiratory nurses and community nurses. On average, patients affiliated with the CLT had fewer hospitalisations and shorter length of hospital stay compared to usual care [56].

BECH *et al.* [57] assessed the benefits on oxygen therapy management through an  $S_{pO_2}$ -based automatic oxygen administration device in patients with COPD. Although there was a feeling of safety in the use of the devices, patients expressed that machines cannot replace healthcare workers in complex healthcare management.

GRANADOS SANTIAGO *et al.* [58] showed that COPD patients' overall perceived health status in the COVID-19 lockdown was significantly lower than before the pandemic ( $p < 0.05$ ), showing enhanced psychological vulnerability. Still on pandemic impact, MIRANDA VALLADARES *et al.* [59] showed that lockdown had a significant negative effect on several clinical variables (*i.e.* FEV<sub>1</sub>% predicted, dyspnoea, distance walked in the 6MWT and BODE (BMI, airflow obstruction, dyspnoea, and exercise capacity) index) on functional capacity and physiological parameters of patients with COPD.

SILVA *et al.* [60] performed a systematic review and meta-analysis on the optimal structure of PR maintenance programmes (PRMP), revealing that 1) PRMP with alternate supervision showed better results concerning the 6MWT and FEV<sub>1</sub>% values than unsupervised programmes, and 2) home-based and supervised PRMP led to better functional capacity improvements than community-based and unsupervised programmes. ALVES VAZ *et al.* [61] presented the preliminary results of the efficacy and safety of an 8-week pulmonary telerehabilitation programme, showing a tendency to an improvement in all clinical variables (*e.g.* dyspnoea, functional capacity, anxiety and depression), with no reported adverse effects.

### *Take-home messages*

- Non-pharmacological interventions (PR, PA promotion and therapeutic education) can increase quality of life in patients with COPD.
- A cross-sectorial lung team consisting of respiratory nurses and community nurses is a feasible way to guarantee patients' accessibility to the right care at the right time.
- Home-based and supervised maintenance programmes may have a more significant impact on patients' functional capacity than community-based and unsupervised programmes.

### *Nursing interventions in various respiratory areas*

This thematic poster session highlighted several nursing practice aspects in the respiratory field. To summarise them, we divided the posters into nursing interventions, review of nurses' clinical practice, and health policies.

### *Nursing interventions*

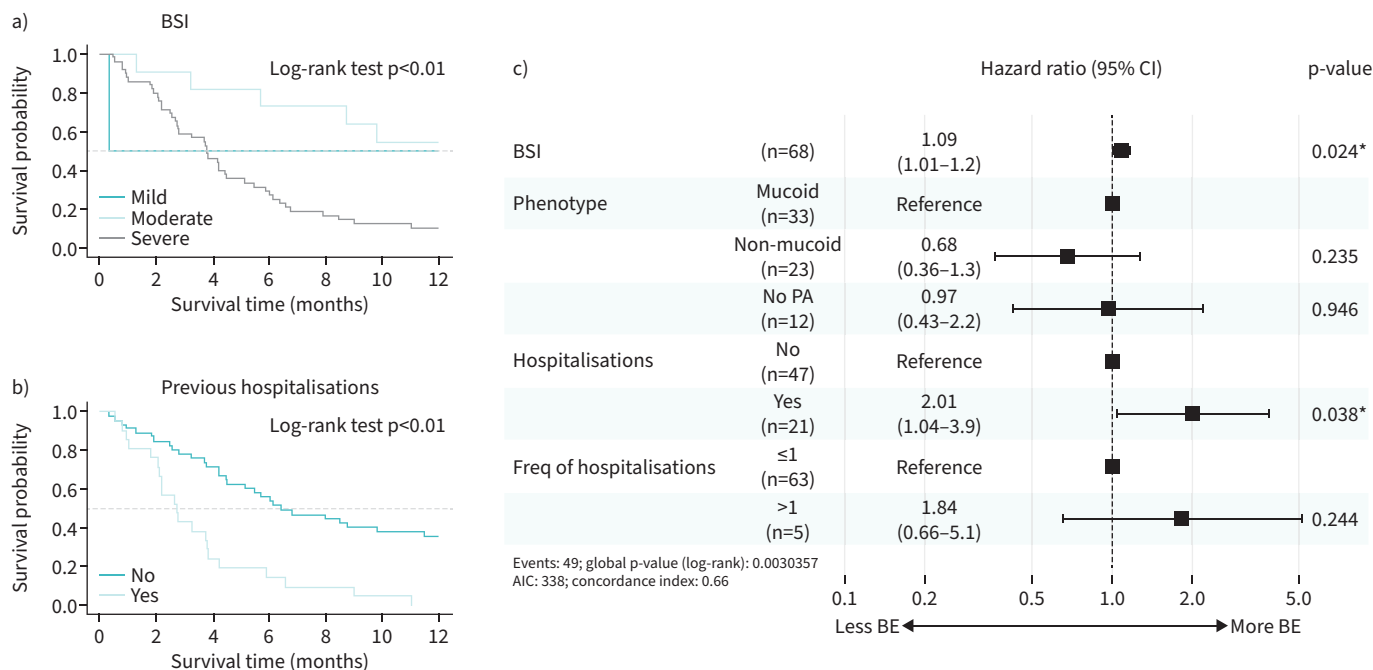
MARTÍN NÚÑEZ *et al.* [62] found that patients with long COVID syndrome had significant cognitive impairment, increased anxiety levels, depression and difficulties in concentration, and decreased memory even 1 year after COVID infection. CARRERA CUEVA *et al.* [63] demonstrated that a telenursing consultation decreased anxiety and depression and increased adherence to treatment among post-COVID-19 patients. In asthma management, SILVA and RODRIGUES [64] presented a quasi-experimental study of a social media-based intervention and showed that it enhanced asthma control, in a statistically and clinically significant way, indicating better control of the disease. MIRANDA VALLADARES *et al.* [65] reinforced that depression and anxiety determine the effects of PR on the quality of life of patients with COPD.

*Review of nurses' clinical practice*

In reviewing low molecular weight heparin injection complications in a retrospective study with COVID-19 pneumonia, KERAMIDA *et al.* [66] found that abdominal haematomas, although uncommon, have relevant clinical significance and suggested re-training and monitoring of subcutaneous heparin injection technique. Based on a cohort study, BUENO FREIRE *et al.* [67] concluded that the severity of bronchiectasis and previous hospitalisations were associated with a higher risk of exacerbations in patients colonised by *Pseudomonas aeruginosa* (figure 1). Regarding aerosol inhalation therapy, YU *et al.* [68] showed the superior efficacy of modified viral and bacterial filters used in aerosol inhalation therapy compared with the usual viral and bacterial filters, preventing particles from spreading to the patient environment without increasing respiratory work. BETTANY [69] showed the benefits of completing nebulised challenges in respiratory patients in primary care settings to alleviate pressures in secondary care, as it appears to be a safe intervention. The TORRALBA GARCÍA *et al.* [70] study disclosed a desaturation-distance relation that showed prognostic value for survival in pre-transplant patients with haematopoietic stem cells. HUSSAIN *et al.* [71] demonstrated a relationship between the automation process in blood monitoring of people with ILD under antifibrotic therapy and a high degree of engagement and satisfaction. Concerning breathlessness, MORRIS *et al.* [72] found that fan therapy may relieve breathlessness in fibrotic ILD. Finally, GRAY-FRENCH *et al.* [73] reviewed the literature on the outcomes of indoor and outdoor aeroallergen exposure in type 2-high childhood asthma and treatment strategies to address them. PORTELA FERREÑO *et al.* [74] studied sleep length and level of knowledge on sleep disorders. Participants reported a low sleep duration (5.6±1.9 h) and 45% were not acquainted with sleep disorders. The authors reflected on the educational role of nursing staff specialised in sleep.

*Health policies*

JOHN *et al.* [75] found a significant inconsistency in clean air policies of schools across district councils in England and claimed that improving this is a priority for childhood respiratory health. BAGNASCO *et al.* [76] studied workplace violence in nurses working in hospital pneumology settings, concluding that public health companies should invest in resources to manage and prevent it. Related to this finding, KOVAČEVIĆ *et al.* [77] showed that work stressors are undoubtedly related to the development of burnout syndrome and can lead to changing the workplace and occupation. Therefore, the priority of healthcare institutions should be actions directed at recognising and reducing job stressors.



**FIGURE 1** Survival curves, log-rank test and multivariate Cox proportional hazards model. Survival curves with the log-rank test according to a) the bronchiectasis severity index (BSI) and b) previous hospitalisations. c) Cox proportional hazards model. PA: *Pseudomonas aeruginosa*; AIC: Akaike information criterion; BE: bronchiectasis exacerbation. \*: p<0.05. Reproduced and modified from [67] with permission.

To optimise respiratory patient care and safety, LOUA HENRIKSEN *et al.* [78] aimed to develop a core competency-based curriculum to meet the educational needs of respiratory nurses that will optimise respiratory patient care and safety in Denmark.

#### *Take-home messages*

- Nursing-specific interventions are shown to be effective in managing respiratory diseases.
- Research, education and monitoring are crucial to improve nursing skills regarding patients' treatment.
- The development of an international curriculum in respiratory nursing is of utmost importance so that every patient can have access to the best possible care.

### **Group 9.04: psychologists and behavioural scientists**

#### *Best abstracts from psychologists and behavioural scientists*

People who are confronted with a chronic respiratory disease often find it difficult to manage the functional and instrumental limitations, as well as to change behavioural lifestyles. Over the past few years, COVID-19 has confronted them with additional emotional triggers that lead to psychological distress, anxiety and/or depression. This thematic poster session included the highest-scored abstracts submitted to Group 9.04, organised in three main topics: bridge between neural processing of respiratory sensations, development of new tools and treatment adherence; e-health interventions; and post-COVID-19 challenges.

#### *Bridge between neural processing of respiratory sensations, development of new tools and treatment adherence*

COPD symptoms like dyspnoea can be influenced by fear, anxiety, and depression [79]. VANDEN BOSSCHE *et al.* [80] showed how high dyspnoea-specific fear is associated with the perception and the neural processing of respiratory sensations, while DENUTTE *et al.* [81] found a common neural mechanism for different qualities of dyspnoea.

These aspects can significantly impact on the types of psychological assistance requests, often related to depressive disorders, poor coping strategies, and non-adherence to therapy [82]. To improve management of respiratory diseases like COPD, a proactive, patient-centred approach should be taken, involving co-development of a standard of care and increasing patient awareness and understanding of their condition to empower them to lead a high-quality life [83], in a multidisciplinary environment [84].

In doing so, it is first of all important to develop a thorough medical history, considering risk factors such as smoking addiction. FARVER-VESTERGAARD *et al.* [85] found that smoking addiction is not investigated in 23.6% of cases and not examined in depth by professionals in 42.5% of cases, despite its possible consequences. In addition, FRÖLUND *et al.* [86] suggested measuring patient participation in consultations, by drawing The Activity Barometer. Similarly, PAGNINI *et al.* [87] developed a new instrument to detect implicit and explicit illness expectations in individuals with asthma, the Illness Expectations Test [88], finding that these expectations can influence asthma progression and adherence. Finally, D'ANCONA *et al.* [89] emphasised that to effectively support patients' transition to inhalers with a lower global warming potential, physicians must recognise patients' individual choices and concerns about the effectiveness of the new inhaler on their asthma control.

#### *e-Health interventions*

VERKLEIJ *et al.* [90] developed the first therapist-guided internet-delivered cognitive behavioural therapy intervention for depression/anxiety in adults with cystic fibrosis. Their study demonstrated the feasibility, acceptability, and efficacy of the training, with 90% improvement in both anxiety and depression scores. In their systematic review, VASEUR *et al.* [91] identified risk, benefit, self-efficacy and patient understanding as important shared decision-making tools and clinical decision support systems [92], which are crucial for shaping the roles of patients and healthcare professionals in decision-making.

#### *Post-COVID-19 challenges*

BOROS *et al.* [93], in line with O'DONNELL *et al.* [94] and LEDESMA *et al.* [95], reported gender differences in the experience of psychological distress following COVID-19, with women being more affected than men [96]. Other studies found a high prevalence of post-traumatic stress disorder (PTSD), anxiety, and depression even 3 months after discharge from hospital [97], with the need for long-term monitoring [98].

BALTAZAR *et al.* [99] found that individuals with low anxiety exhibited effective psychophysiological adaptation. ROSAS TRUJILLO *et al.* [100] reported that patients who were conscious during hospitalisation and did not undergo invasive mechanical ventilation (IMV) were more at risk of developing PTSD than



those with IMV who were sedated [101]. Moreover, CASARIN LÓPEZ *et al.* [102] and ROSAS TRUJILLO *et al.* [103] found a high prevalence of probable mild cognitive impairment in patients as early as 9 months after discharge, in contrast to those with IMV who had a recovery time of 3–6 months and presented difficulties in the executive and memory domains [104]. As possible treatments, PELÁEZ-HERNÁNDEZ *et al.* [105] implemented an eight-session virtual mindfulness-based cognitive therapy to reduce emotional distress and IL-6 levels [106].

#### Take-home messages

- Psychological distress, anxiety, and adherence to proposed treatments are among the main components of the psychological needs of people with respiratory diseases.
- The development of e-health interventions and recent measurement tools suggests a focus on patient involvement, adherence, expectations and environment.
- COVID-19 further emphasises the need to monitor patients' psychological well-being, with attention to certain symptoms, such as those of PTSD, as well as the development of cognitive impairment even several months after discharge.

#### Final remarks

This Highlights article provides valuable insight into the latest scientific data and clinical insights gained from several sessions presented at the 2022 ERS Congress, hoping to inspire readers to keep up to date in their areas of interest. We look forward to seeing you in Milan in 2023 for another successful ERS Congress!

Provenance: Commissioned article, peer reviewed.

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