

Northumbria Research Link

Citation: Hume, Emily (2022) The concomitant assessment of pain and dyspnea in acute exacerbations of chronic obstructive pulmonary disease; is pain an understudied factor? *Chronic Respiratory Disease*, 19. p. 147997312211055. ISSN 1479-9731

Published by: SAGE Publications

URL: <https://doi.org/10.1177/14799731221105516>
<<https://doi.org/10.1177/14799731221105516>>

This version was downloaded from Northumbria Research Link:
<http://nrl.northumbria.ac.uk/id/eprint/49333/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)

The concomitant assessment of pain and dyspnea in acute exacerbations of chronic obstructive pulmonary disease; is pain an understudied factor?

Chronic Respiratory Disease
Volume 19: 1–3
© The Author(s) 2022
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/14799731221105516
journals.sagepub.com/home/crd


Emily Hume¹ 

Date received: 26 November 2021; revised: 15 March 2022; accepted: 13 May 2022

Dyspnea is a prominent symptom of Chronic Obstructive Pulmonary Disease (COPD), occurring as a result of expiratory flow limitation, which may lead to varying degrees of dynamic hyperinflation, hypoxemia, hypercapnia and neuromechanical dissociation.¹ Although pain appears to be a prevalent symptom in COPD patients,² it is rarely considered in clinical practice guidelines for the management of the disease,³ which could be due to pain being a complex and understudied factor in COPD. When compared to other disease entities (diabetes, heart disease and arthritis), COPD patients had an increased risk of pain prevalence and intensity, second only to those with arthritis.⁴ There are several underlying mechanisms that may contribute to higher pain prevalence in COPD compared to healthy individuals. These include increased and persistent respiratory muscle loading, along with systemic inflammation, musculoskeletal disorders and co-morbidities.⁵ In patients with stable COPD, pain is a prevalent symptom which negatively impacts quality of life,² and is associated with higher levels of lung hyperinflation and dyspnea.^{6,7} An acute exacerbation of COPD (AECOPD) occurs when there is an acute worsening of respiratory symptoms requiring additional treatment.⁸ Thus, given the relationship between the two perceptions, many factors linked to pain in the stable state tend to worsen during an AECOPD.

The systematic review by Clarke et al. focused on the prevalence of pain and dyspnea experienced concurrently in people admitted to hospital with an AECOPD. A total of 1300 articles were identified from initial database searches, however only four studies met the inclusion criteria and were included in the review. Pain and dyspnea are both unpleasant sensations which share many clinical, physiological and psychological features.⁹ Brain imaging studies

highlight that perceptions of pain and dyspnea activate similar cortical regions of the brain,¹⁰ and share common neural mechanisms.¹¹ Due to these commonalities, the review aimed to further understand the interactions between pain and dyspnea, and their clinical implications during an AECOPD. Of the available data, pooled prevalence of pain and dyspnea was 44% and 91% respectively, demonstrating that both symptoms are prevalent in COPD patients during acute exacerbations. However, due to the small number of studies co-reporting pain and dyspnea, the scope of the review to draw clinical associations and implications of both symptoms during AECOPD was limited.

As described by the authors in the review, management of COPD exacerbations primarily focuses on relieving dyspnea, reducing medication and oxygen requirements, returning to baseline function and follow up care. Discharge care bundles have been shown to reduce hospital readmissions following hospitalisation for an AECOPD, but did not improve survival or quality of life.¹² The individual components of discharge bundles tend to vary and it is not clear whether pain is considered within the education and self-management plans. This is likely due to pain during exacerbations being under recognised and under researched, as highlighted by Clarke et al., limiting the

¹Department of Sport, Exercise and Rehabilitation, Faculty of Health & Life Sciences, Northumbria University, Newcastle upon Tyne, UK

Corresponding author:

Emily Hume, Department of Sport, Exercise and Rehabilitation, Faculty of Health & Life Sciences, Northumbria University, Newcastle upon Tyne NE1 8ST, UK.

Email: emily.c.hume@northumbria.ac.uk



Creative Commons CC BY: This article is distributed under the terms of the Creative Commons Attribution 4.0 License (<https://creativecommons.org/licenses/by/4.0/>) which permits any use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

evidence base for including pain management in clinical care guidelines. However, it is important to distinguish published research from frontline clinical care, as clinical providers may be treating symptoms such as pain routinely and detailing this in patient records, which may not be captured in a research study.

The research examining pain independently of dyspnea during AECOPD still appears to be limited. Cheng et al.¹³ showed that pain intensity and interference scores were significantly higher during AECOPD, compared to stable COPD. However, there was no significant difference in pain prevalence between AECOPD (31% of patients) and stable COPD (24% of patients), or pain locations (chest and back). This finding differs from the study by Maignan et al.⁷ who showed pain was usually located in the limbs during the stable phase, but in the chest during an AECOPD. Pain in the back, shoulders, neck and chest in COPD patients could be due to the excessive work of breathing, chest tightness and the perception of the urge to breath.¹⁴

In people with stable COPD, chronic pain has been shown to have numerous clinical implications, such as increased medical costs, as well as adversely impacting quality of life, fatigue, depression and participation in physical activity and activities of daily living.³ All of which are factors known to impact survival and clinical outcomes in COPD patients.^{15,16} Pain may also limit a patient's ability to partake in evidence-based interventions such as pulmonary rehabilitation,³ which may contribute to the poor uptake and completion of this intervention.¹⁷ This indicates that pain warrants clinical attention in both stable COPD and AECOPD in routine practice, to better understand causes, trajectories and characteristics of pain.

Determining the optimal tool for assessing pain appears to be an important issue. The review by Clarke et al. highlights a wide range of different outcome measures and focal periods that have been used to assess pain and dyspnea, with six tools used for pain and four for dyspnea within the four studies included. This makes it challenging to synthesise information from the available evidence. A systematic review in stable COPD patients also highlighted this issue, with the most common tool being a pain specific questionnaire (Brief Pain Inventory), however some studies used a screening question (e.g., 'Are you generally bothered with pain?') or pain as a sub-domain of a quality of life instrument (e.g., SF-36 or EQ-5D).² Thus, Clarke et al. importantly emphasise that standardising assessment tools with clearly defined focal periods is vital for improving understanding into the prevalence, intensity, and associations of pain.

In conclusion, the review from Clarke et al. highlights that dyspnea and pain are prevalent symptoms during AECOPD, which aligns with previous research examining these symptoms in stable COPD. Overall, the research evaluating pain as a symptom in COPD patients is limited,

particularly during AECOPD. This is concerning due to its association with other symptoms, co-morbidities and diminished quality of life. Thus, more research using standardised assessment tools is needed to better understand the causes, trajectories, and characteristics of pain independently of other symptoms in both stable and exacerbated COPD patients, and enable the development of effective treatment strategies.

ORCID iD

Emily Hume  <https://orcid.org/0000-0003-0462-2395>

References

1. Antoniu SA. Descriptors of dyspnea in obstructive lung diseases. *Multidisciplinary Respir Med* 2010; 5: 216. DOI: [10.1186/2049-6958-5-3-216](https://doi.org/10.1186/2049-6958-5-3-216)
2. van Dam van Isselt EF, Groenewegen-Sipkema KH, Spruit-van Eijk M, et al. Pain in patients with COPD: a systematic review and meta-analysis. *BMJ Open* 2014; 4: e005898. DOI: [10.1136/bmjopen-2014-005898](https://doi.org/10.1136/bmjopen-2014-005898)
3. Lewthwaite H, Williams G, Baldock KL, et al. Systematic review of pain in clinical practice guidelines for management of COPD: a case for including chronic pain? *Healthcare (Basel)* 2019; 7: 2019. DOI: [10.3390/healthcare7010015/01/27](https://doi.org/10.3390/healthcare7010015/01/27)
4. Andenæs R, Momyr A and Brekke I. Reporting of pain by people with chronic obstructive pulmonary disease (COPD): comparative results from the HUNT3 population-based survey. *BMC Public Health* 2018; 18: 181. DOI: [10.1186/s12889-018-5094-5](https://doi.org/10.1186/s12889-018-5094-5)
5. HajGhanbari B, Holsti L, Road JD, et al. Pain in people with chronic obstructive pulmonary disease (COPD). *Respir Med* 2012; 106: 998–1005. DOI: [10.1016/j.rmed.2012.03.004](https://doi.org/10.1016/j.rmed.2012.03.004)
6. Schön D, Rosenkranz M, Regelsberger J, et al. Reduced perception of dyspnea and pain after right insular cortex lesions. *Am J Respir Crit Care Med* 2008; 178: 1173–1179. DOI: [10.1164/rccm.200805-731OC](https://doi.org/10.1164/rccm.200805-731OC)
7. Maignan M, Chauny JM, Daoust R, et al. Pain during exacerbation of chronic obstructive pulmonary disease: a prospective cohort study. *PLoS One* 2019; 14: e0217370. DOI: [10.1371/journal.pone.0217370](https://doi.org/10.1371/journal.pone.0217370)
8. Mathioudakis AG, Janssens W, Sivapalan P, et al. Acute exacerbations of chronic obstructive pulmonary disease: in search of diagnostic biomarkers and treatable traits. *Thorax* 2020; 75: 520. DOI: [10.1136/thoraxjnl-2019-214484](https://doi.org/10.1136/thoraxjnl-2019-214484)
9. Nishino T, Yashiro E, Yogo H, et al. Comparison of pain and dyspnea perceptual responses in healthy subjects, 2010; *PAIN* 148(3): 426–430.
10. von Leupoldt A, Sommer T, Kegat S, et al. Dyspnea and pain share emotion-related brain network. *NeuroImage* 2009; 48: 200–206. DOI: [10.1016/j.neuroimage.2009.06.015](https://doi.org/10.1016/j.neuroimage.2009.06.015)
11. Nishino T. Dyspnoea: underlying mechanisms and treatment. *Br J Anaesth* 2011; 106: 463–474. DOI: [10.1093/bja/aer040](https://doi.org/10.1093/bja/aer040)

12. Ospina MB, Mrklas K, Deuchar L, et al. A systematic review of the effectiveness of discharge care bundles for patients with COPD. *Thorax* 2017; 72: 31. DOI: [10.1136/thoraxjnl-2016-208820](https://doi.org/10.1136/thoraxjnl-2016-208820)
13. Cheng W, Li X, Duan J, et al. Prevalence and characteristics of pain in patients of chronic obstructive pulmonary disease: a cross-sectional study in China. *COPD: J Chronic Obstructive Pulm Dis* 2020; 17: 90–100. DOI: [10.1080/15412555.2020.1713076](https://doi.org/10.1080/15412555.2020.1713076)
14. Nishino T. Dyspnea and its interaction with pain. *J Anesth* 2011; 25: 157–161. DOI: [10.1007/s00540-010-1065-4](https://doi.org/10.1007/s00540-010-1065-4)
15. Garcia-Aymerich J, Lange P, Benet M, et al. Regular physical activity reduces hospital admission and mortality in chronic obstructive pulmonary disease: a population based cohort study. *Thorax* 2006; 61: 772–778. DOI: [10.1136/thx.2006.060145](https://doi.org/10.1136/thx.2006.060145)
16. Halpin DMG, Peterson S, Larsson TP, et al. Identifying COPD patients at increased risk of mortality: Predictive value of clinical study baseline data. *Respir Med* 2008; 102: 1615–1624. DOI: [10.1016/j.rmed.2008.05.007](https://doi.org/10.1016/j.rmed.2008.05.007)
17. Steiner M, Holzhauer-Barrie J., Lowe D., et al. *Pulmonary Rehabilitation: Steps to Breathe better National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme: Clinical Audit of Pulmonary Rehabilitation Services in England and Wales 2015. National Clinical Audit Report. 2016.* London: RCP; 2016.