



Early Post-Discharge Predictors of Sedentary Behavior Following COPD Exacerbation: An Observational Study. Authors' Responses

Maria Gabriela Colucci , Joana Cruz , Luiz Augusto Brusaca , Débora Mayumi de Oliveira Kawakami , Gustavo Henrique Guimarães Araujo , Manuela Karloh , Renata Gonçalves Mendes & Valéria Amorim Pires Di Lorenzo

To cite this article: Maria Gabriela Colucci , Joana Cruz , Luiz Augusto Brusaca , Débora Mayumi de Oliveira Kawakami , Gustavo Henrique Guimarães Araujo , Manuela Karloh , Renata Gonçalves Mendes & Valéria Amorim Pires Di Lorenzo (2026) Early Post-Discharge Predictors of Sedentary Behavior Following COPD Exacerbation: An Observational Study. Authors' Responses, COPD: Journal of Chronic Obstructive Pulmonary Disease, 23:1, 2641663, DOI: [10.1080/15412555.2026.2641663](https://doi.org/10.1080/15412555.2026.2641663)

To link to this article: <https://doi.org/10.1080/15412555.2026.2641663>



© 2026 The Author(s). Published with license by Taylor & Francis Group, LLC



Published online: 06 Apr 2026.



Submit your article to this journal [↗](#)



Article views: 255



View related articles [↗](#)



View Crossmark data [↗](#)

Early Post-Discharge Predictors of Sedentary Behavior Following COPD Exacerbation: An Observational Study. Authors' Responses

Maria Gabriela Colucci^a, Joana Cruz^{b,c}, Luiz Augusto Brusaca^{d,e}, Débora Mayumi de Oliveira Kawakami^a, Gustavo Henrique Guimarães Araujo^a, Manuela Karloh^f, Renata Gonçalves Mendes^a and Valéria Amorim Pires Di Lorenzo^a

^aDepartment of Physical Therapy, Federal University of São Carlos, São Carlos, São Paulo, Brazil; ^bCenter for Innovative Care and Health Technology (ciTechCare), Polytechnic of Leiria, Leiria, Portugal; ^cSchool of Health Sciences (ESSLei), Polytechnic of Leiria, Leiria, Portugal; ^dDepartment of Occupational Health, Psychology and Sports Sciences, University of Gävle, Gävle, Sweden; ^eNational Research Center for the Working Environment, Copenhagen, Denmark; ^fDepartment of Physical Therapy, State University of Santa Catarina, Florianópolis, Brazil

Dear Editor,

We sincerely appreciate the interest in our article entitled “Early predictors of sedentary behavior after hospital discharge in COPD exacerbation: an observational study” (1), published in the journal COPD: Journal of Chronic Obstructive Pulmonary Disease. We appreciate the pertinent comments from Sen et al. (2) and Priya et al. (3), which offer valuable perspectives on our work. We are grateful for the opportunity to further clarify certain methodological and interpretative aspects of the study.

We thank the authors for their comments regarding the use of stepwise multiple linear regression. We recognize that stepwise procedures have well-known limitations, including potential model instability and overfitting. However, in the context of a relatively small sample size and multiple candidate variables, a variable selection strategy was adopted to reduce model complexity and minimize the risk of overfitting, as discussed in the regression modeling literature (4,5). The analysis was conducted with an exploratory purpose, aiming to identify possible early factors associated with sedentary behavior (SB) rather than to develop or validate a clinical prediction model. Therefore, findings should be interpreted as hypothesis-generating. In addition, collinearity diagnostics were performed to support model stability and internal consistency.

Regarding the variance explained by the model, we agree that not all potentially relevant determinants of SB were captured. Since SB in COPD is influenced by a wide range of biopsychosocial and environmental factors, it is unlikely that a single model based on clinical data alone would account for all observed variability. Although the adjusted R^2 of 0.31 indicates that additional determinants remain unmeasured, this magnitude of explained variance is not uncommon in studies examining behavioral outcomes (6). In such contexts, moderate R^2 values may still represent clinically meaningful associations. Importantly, model evaluation should not solely rely on the proportion of explained variance. Statistical significance, overall model fit, the strength of associations, and the internal consistency of the findings also contribute to result interpretation. However, we reinforce that the present findings should be considered exploratory and intended for hypothesis generation, and should not be interpreted as definitive for clinical risk stratification. Additional studies may help identify more comprehensive psychosocial and environmental health-related variables, and conducted in larger samples, may further improve explanatory power and external validity.

We agree with the authors that psychosocial and environmental determinants, depression, anxiety, social support, living conditions, and access to pulmonary rehabilitation are important influences in individuals with COPD (7). However, the aim of our study was to examine factors within the set of clinical and behavioral variables available during the initial post-hospital discharge period, and not to establish independent predictors. The associations identified between dyspnea, light

CONTACT Valéria Amorim Pires Di Lorenzo ✉ vallorenzo@ufscar.br Department of Physical Therapy, Federal University of São Carlos, Rodovia Washington Luis, Km 235, São Carlos, São Paulo, 13565-905, Brazil

© 2026 The Author(s). Published with license by Taylor & Francis Group, LLC

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

physical activity (LPA), and SB should be interpreted within this exploratory and context-specific framework.

We agree that future research, including broader psychosocial and environmental factors, is needed to better understand the contribution of these multidimensional determinants. However, the two variables retained in the final exploratory model, dyspnea severity and LPA, reflect individual patient status rather than local care pathways. Both are clinically measurable and have been consistently associated with functional capacity and behavioral patterns in COPD across different settings (8).

In the present study, LPA was treated as an independent behavioral indicator reflecting early functional status during recovery, without modeling the full compositional structure of daily time use. Activity was measured and processed using ActiPASS software v.2025.04 (9), which classifies SB, LPA, and higher-intensity activity across waking time, ensuring that domains sum to the total awake period, as recommended in objective physical activity research (10,11). This approach, consistent with previous studies in exacerbated COPD (ECOPD) and recovery (12), was chosen to provide clinically interpretable findings within an exploratory framework. We acknowledge that compositional or awake-time-adjusted analyses could further clarify whether associations reflect true behavioral determinants or expected time redistribution. Future investigations using compositional methods and larger samples may improve understanding of movement behavior changes during recovery.

We acknowledge that SB is a heterogeneous construct influenced by multiple clinical, functional, and environmental factors. Previous studies have shown that SB in COPD is associated with exercise capacity, dyspnea, lung function, muscle strength, comorbidities, disease severity, and contextual factors (13,14). In our study, SB was assessed as total waking time spent sedentary, allowing direct comparisons and clinically interpretable measures. However, this approach does not distinguish between different contexts of sedentary time, such as intentional rest, social sitting, or prolonged passive inactivity, which may have different implications for recovery. Subsequent studies may provide contextual information to help differentiate adaptive rest from potentially harmful inactivity, thereby improving the clinical interpretation of SB in COPD.

The study by Tofoli et al. (8) provides evidence that sedentary time in individuals with stable COPD is influenced by clinical and functional factors such as exercise capacity, dyspnea, and disease severity. Their findings support the view that SB is not merely a passive outcome, but a behavior shaped by potentially modifiable determinants. Consistent with this perspective, our results showing that early post-discharge LPA and dyspnea are associated with subsequent SB reinforce the importance of identifying early clinical and behavioral markers during recovery. Together, these findings highlight the relevance of understanding the determinants of SB as a basis for developing interventions. Future research may explore targeted strategies such as early rehabilitation referral, behavioral support, or remote activity monitoring to reduce sedentary time and promote more favorable recovery trajectories in COPD.

We thank Sen et al. (2) and Priya et al. (3) for the constructive suggestions and reiterate the exploratory nature of this study. Future studies designed using compositional or time-aware frameworks, and incorporating contextual assessments may further support the identification of modifiable targets and the development of more targeted, patient-centered intervention strategies during the early recovery period following ECOPD.

Author contributions

CRedit: **Maria Gabriela Colucci:** Formal analysis, Funding acquisition, Investigation, Methodology, Software, Writing – original draft, Writing – review & editing; **Joana Cruz:** Conceptualization, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing; **Luiz Augusto Brusaca:** Formal analysis, Methodology, Software, Writing – original draft, Writing – review & editing; **Débora Mayumi de Oliveira Kawakami:** Methodology, Writing – original draft, Writing – review & editing; **Gustavo Henrique Guimarães Araujo:** Methodology, Writing – original draft, Writing – review & editing; **Manuela Karloh:** Methodology, Writing – original draft, Writing – review & editing; **Renata Gonçalves Mendes:** Methodology, Supervision, Writing – original draft, Writing – review & editing; **Valéria Amorim Pires Di Lorenzo:** Formal analysis, Investigation, Methodology, Supervision, Writing – original draft, Writing – review & editing.

Funding

This work was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, 88887.824130/2023-00.

References

1. Colucci MG, Cruz JP, Brusaca LA, et al. Early post-discharge predictors of sedentary behavior following COPD exacerbation: an observational study. *COPD: journal of Chronic Obstructive Pulmonary Disease*. 2026;23(1):2600130. doi: [10.1080/15412555.2025.2600130](https://doi.org/10.1080/15412555.2025.2600130).
2. Sen D, Pradhan S, Saha M, et al. Letter to the editor - early post-discharge predictors of sedentary behavior following COPD exacerbation. *COPD*. 2026;23(1):2629544. doi: [10.1080/15412555.2026.2629544](https://doi.org/10.1080/15412555.2026.2629544).
3. Priya S, Saha M, Chatterjee S, et al. Comentário sobre “Predictores precoces de comportamento sedentário após alta hospitalar em exacerbação de DPOC: um estudo observacional”. *DPOC*. 2026;23(1). doi: [10.1080/15412555.2026.2631252](https://doi.org/10.1080/15412555.2026.2631252).
4. Babyak MA. What you see may not be what you get: a brief, nontechnical introduction to overfitting in regression-type models. *Psychosom Med*. 2004;66(3):411–421. doi: [10.1097/01.psy.0000127692.23278.a9](https://doi.org/10.1097/01.psy.0000127692.23278.a9).
5. Harrell FE Jr. *Regression Modeling Strategies: with Applications to Linear Models, Logistic Regression, and Survival Analysis*. 2nd ed. Cham: Springer; 2015.
6. Ozsoy I, Ozcan Kahraman B, Acar S, et al. Factors influencing activities of daily living in subjects with COPD. *Respir Care*. 2019;64(2):189–195. doi: [10.4187/respcare.05938](https://doi.org/10.4187/respcare.05938).
7. Esteban C, Antón-Ladislao A, Aramburu A, ReEPOC-REDISSEC group., et al. Physical activity and sedentary behaviour in patients admitted with COPD: associated factors. *Respir Med Res*. 2023;84:101052. doi: [10.1016/j.resmer.2023.101052](https://doi.org/10.1016/j.resmer.2023.101052).
8. Tofoli TM, Santin L, Medeiros L, et al. Determinant factors of sedentary time in individuals with COPD. *Respir Med*. 2024;234:107839. doi: [10.1016/j.rmed.2024.107839](https://doi.org/10.1016/j.rmed.2024.107839).
9. Hettiarachchi P, Johansson P. *ActiPASS (Version 2025.04)*. [computer software]. Geneva: zenodo; 2025.
10. Kozey-Keadle S, Libertine A, Lyden K, et al. Validation of wearable monitors for assessing sedentary behavior. *Med Sci Sports Exerc*. 2011;43(8):1561–1567. doi: [10.1249/MSS.0b013e31820ce174](https://doi.org/10.1249/MSS.0b013e31820ce174).
11. Demeyer H, Mohan D, Burtin C, et al. Objectively measured physical activity in COPD patients: recommendations from an international task force. *Chronic Obstr Pulm Dis*. 2021;8(4):528–550. doi: [10.1532/jcopdf.2021.0213](https://doi.org/10.1532/jcopdf.2021.0213).
12. Oliveira BSV, Sentanin AC, Bueno LG, et al. Avaliação do nível de atividade física e força muscular do quadríceps em pacientes hospitalizados por DPOC exacerbada: um estudo longitudinal. *COPD*. 2021;18(5):511–517.
13. Murakami Y, Minakata Y, Kato M, et al. Determinants of activity phenotype in patients with chronic obstructive pulmonary disease. *Int J Chron Obstruct Pulmon Dis*. 2023;18:1919–1929. doi: [10.2147/COPD.S421755](https://doi.org/10.2147/COPD.S421755).
14. Harding S, Richardson A, Glynn A, et al. Factors influencing sedentary behaviour in people with chronic obstructive pulmonary disease: a systematic review. *BMJ Open Respir Res*. 2024;11(1):e002261. doi: [10.1136/bmjresp-2023-002261](https://doi.org/10.1136/bmjresp-2023-002261).