

Letter to the Editor

Authors' Reply: The Transtheoretical Model: Is It Still the Best We Have?

Pernille Lunde¹, PhD; Asta Bye^{2,3}, PhD; Jostein Grimsmo⁴, PhD; Are Hugo Pripp^{1,5}, PhD; Vibeke Ritschel⁶, PhD; Even Jarstad⁶, MSc; Birgitta Blakstad Nilsson^{1,7}, PhD

¹Department of Rehabilitation Science and Health Technology, Faculty of Health Sciences, OsloMet – Oslo Metropolitan University, Oslo, Norway

²Department of Nursing and Health Promotion, Faculty of Health Sciences, OsloMet – Oslo Metropolitan University, Oslo, Norway

³European Palliative Care Research Centre (PRC), Department of Oncology, Oslo University Hospital and Institute of Clinical Medicine, University of Oslo, Oslo, Norway

⁴Department of Cardiac and Pulmonary Rehabilitation, Lovisenberg Rehabilitation, Cathinka Guldberg's Hospital, Jessheim, Norway

⁵Oslo Centre of Biostatistics and Epidemiology, Oslo University Hospital, Oslo, Norway

⁶Department of Cardiology and Exercise Physiology, Norwegian Sport Medicine Clinic (Nimi, part of Volvat), Oslo, Norway

⁷Section for Physiotherapy, Division of Medicine, Oslo University Hospital, Oslo, Norway

Corresponding Author:

Pernille Lunde, PhD
Department of Rehabilitation Science and Health Technology
Faculty of Health Sciences, OsloMet – Oslo Metropolitan University
PB 4, St. Olavs Plass
Oslo, 0130
Norway
Phone: 47 48063537
Email: plunde@oslomet.no

Related Articles:

Comment on: <https://www.jmir.org/2025/1/e75579>

Comment on: <https://www.jmir.org/2025/1/e60256/>

J Med Internet Res 2025;27:e79131; doi: [10.2196/79131](https://doi.org/10.2196/79131)

Keywords: mHealth; cardiac rehabilitation; mobile phone app; smartphone; lifestyle; mobile health intervention; behavior change; chronic disease management; mobile health

We appreciate the thoughtful commentary and constructive perspectives by Cen and Lin [1] on our study, “Effects of Individualized Follow-Up With an App Postcardiac Rehabilitation: Five-Year Follow-Up of a Randomized Controlled Trial” [2]. This response aims to clarify aspects of our study that may have been misunderstood based on the claims presented by the authors [1].

First, Cen and Lin suggest that the most telling result is that the decline in outcomes began as early as 1 year. We would like to clarify that the exact timing of the decline is unknown. In our 2020 publication [3], we demonstrated that individualized follow-up via a mobile app was effective compared to usual care in improving peak oxygen uptake, exercise performance, exercise habits, and self-perceived goal achievement at the 1-year follow-up. At that point, the intervention ended, and both groups were transferred to usual care. Four years post intervention, with no contact with participants during this period, we observed that the previously demonstrated effects had diminished. Since no

assessments were conducted between the 1-year and 5-year follow-ups, it remains unclear whether the decline began immediately after the intervention, at 1 year, or later.

Second, we appreciate that Cen and Lin raise the important issue of theoretical framework in intervention design. As emphasized by the Medical Research Council, the use of a theoretical framework and evidence-based strategies is essential for understanding mechanisms of change and evaluating complex interventions. While the intervention in our study was ongoing, we found the transtheoretical model appropriate as it acknowledges that behavior change is nonlinear, and the need for support and use of behavioral change techniques vary across stages [4]. However, Cen and Lin rightly question whether the model remains conceptually aligned when the intended outcome lies beyond the duration of the intervention. At the time of publishing our 1-year results, no prior study had demonstrated the effect of a 1-year app-based follow-up. This motivated us to seek funding for long-term follow-up. Had the 4-year results shown sustained

effects, the findings would have been groundbreaking in addressing nonadherence in this population. However, as our recent results demonstrated, achieving the termination phase of behavior change within 1-year of follow-up appears unlikely for patients with cardiac disease. As noted in our paper [2], and in line with Cohen's definition of adherence

in cardiovascular risk reduction [5], long-term adherence depends on an ongoing, collaborative relationship between the patient and health care provider. Thus, if the goal is sustained self-management, the transtheoretical model may not be the most appropriate framework.

Acknowledgments

The authors used generative AI to improve the language and clarity of the manuscript. They reviewed and approved all edits to ensure accuracy and integrity.

Conflicts of Interest

None declared.

References

1. Cen K, Lin J. The transtheoretical model: is it still the best we have? *J Med Internet Res*. 2025;27:e75579. [doi: [10.2196/75579](https://doi.org/10.2196/75579)]
2. Lunde P, Bye A, Grimsmo J, et al. Effects of individualized follow-up with an app postcardiac rehabilitation: five-year follow-up of a randomized controlled trial. *J Med Internet Res*. Feb 13, 2025;27:e60256. [doi: [10.2196/60256](https://doi.org/10.2196/60256)] [Medline: [39946716](https://pubmed.ncbi.nlm.nih.gov/39946716/)]
3. Lunde P, Bye A, Bergland A, Grimsmo J, Jarstad E, Nilsson BB. Long-term follow-up with a smartphone application improves exercise capacity post cardiac rehabilitation: A randomized controlled trial. *Eur J Prev Cardiol*. Nov 2020;27(16):1782-1792. [doi: [10.1177/2047487320905717](https://doi.org/10.1177/2047487320905717)] [Medline: [32106713](https://pubmed.ncbi.nlm.nih.gov/32106713/)]
4. Prochaska JO, Redding CA, Evers KE. The transtheoretical model and stages of change. In: Glanz K, Rimer BK, Viswanath K, editors. *Health Behavior: Theory, Research, and Practice*. Jossey-Bass/Wiley; 2015:125-148.
5. Cohen SM. Concept analysis of adherence in the context of cardiovascular risk reduction. *Nurs Forum*. 2009;44(1):25-36. [doi: [10.1111/j.1744-6198.2009.00124.x](https://doi.org/10.1111/j.1744-6198.2009.00124.x)] [Medline: [19187051](https://pubmed.ncbi.nlm.nih.gov/19187051/)]

Edited by Denise Kuo; This is a non-peer-reviewed article; submitted 17.06.2025; accepted 17.06.2025; published 07.07.2025

Please cite as:

Lunde P, Bye A, Grimsmo J, Pripp AH, Ritschel V, Jarstad E, Nilsson BB
Authors' Reply: The Transtheoretical Model: Is It Still the Best We Have?
J Med Internet Res 2025;27:e79131
URL: <https://www.jmir.org/2025/1/e79131>
doi: [10.2196/79131](https://doi.org/10.2196/79131)

© Pernille Lunde, Asta Bye, Jostein Grimsmo, Are Hugo Pripp, Vibeke Ritschel, Even Jarstad, Birgitta Blakstad Nilsson. Originally published in the Journal of Medical Internet Research (<https://www.jmir.org>), 07.07.2025. This is an open-access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in the Journal of Medical Internet Research (ISSN 1438-8871), is properly cited. The complete bibliographic information, a link to the original publication on <https://www.jmir.org/>, as well as this copyright and license information must be included.