

Evaluation of a telehealthcare intervention for patients with COPD
Health- and patient-related evaluation of the Danish TeleCare North trial
by
Pernille Heyckendorff Lilholt

The healthcare system is facing challenges regarding the treatment of chronic obstructive pulmonary disease (COPD), necessitating alternative ways to treat these patients. Telehealthcare could be this alternative. A range of studies have been conducted to evaluate the effectiveness of telehealthcare, but they generally conclude that there is a need for more large-scale studies to obtain sufficient evidence. In this context, a Danish large-scale trial (TeleCare North) was launched in the North Denmark Region in 2012 to enable the management of COPD from patients' home environments through telehealthcare. The overall aim of this dissertation was to evaluate the TeleCare North trial's intervention. The PhD thesis focused more specifically on: I) developing a trial protocol for the Danish, cluster-randomized, large-scale trial, TeleCare North; II) evaluating the trial's telehealthcare system, Telekit, in terms of its usability and patient experiences; and III) evaluating the trial's outcomes regarding health-related quality of life (HRQoL). These focus areas were addressed in seven papers.

In the first part of the PhD thesis, a study protocol for the TeleCare North trial was developed to describe the trial's research design and intervention. The intervention group (n=578) received telehealthcare and existing clinical care; the control group (n=647) received existing clinical care. Telehealthcare entailed an online data exchange between patients and healthcare providers. Comparative outcomes were collected during the trial period to evaluate the effectiveness and cost-effectiveness.

In the second part of this thesis, the Telekit system's usability and patients' user experiences were assessed through a series of usability studies. These studies indicated that Telekit was suitable for use in the self-management of patients with COPD, but design improvements were suggested by the usability experts. The outcomes of the usability studies served as inputs for design improvements and led to significant changes to the Telekit system.

In the third part of this thesis, HRQoL was evaluated at baseline and at 12-month follow-up using the Short-Form (36) Health Survey. Non-significant differences in HRQoL from baseline to 12 months were identified between the intervention and control group and subgroups ($p>0.05$). However, compared with existing clinical care, a slower rate of deterioration over time was identified in the intervention group.

In conclusion, this thesis demonstrated that the Telekit system was user-friendly and that the patients experienced enhanced freedom, security, control, and greater awareness of COPD symptoms. The telehealthcare intervention compared to existing care did not lead to poorer quality of life. However, the potential of telehealthcare to support self-management in the whole group of patients with COPD is still limited if the impact of interest is to improve quality of life. Future research should examine which subgroups of patients with COPD are most likely to benefit from using telehealthcare.

Trial registration: ClinicalTrials.gov, NCT01984840

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PhD lecture
by
Pernille Heyckendorff Lilholt
Wednesday 26 October 2016



DEPARTMENT OF HEALTH SCIENCE AND TECHNOLOGY
AALBORG UNIVERSITY

This thesis is based on
Pernille Heyckendorff Lilholt's research work at:

Medical Informatics Group
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To fulfill the requirements for the PhD degree, Pernille Heyckendorff Lilholt has submitted the thesis: “Evaluation of a telehealthcare intervention for patients with COPD: Health- and patient-related evaluation of the Danish TeleCare North trial”, to the Faculty Council of Medicine at Aalborg University.

The Faculty Council has appointed the following adjudication committee to evaluate the thesis and the associated lecture:

Professor Abdul Roudsari
Health Information Science
University of Victoria
Canada

Professor Ron Summers
Mechanical, Electrical and Manufacturing Engineering
Loughborough University
United Kingdom

Chairman:
Professor Ann Bygholm
Department of Communication and Psychology
Aalborg University
Denmark

Moderator:
Associate Professor Mette Dencker Johansen
Department of Health Science and Technology
Aalborg University
Denmark

The PhD lecture is public and will take place on:

Wednesday 26 October 2016 at 13:00
Aalborg University
Niels Jernes Vej 14, 4-117
9220 Aalborg East

Program for PhD lecture

by

Pernille Heyckendorff Lilholt

Wednesday 26 October 2016

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Chairman: Professor Ann Bygholm
Moderator: Associate Professor Mette Dencker Johansen

13.00	Opening by the Moderator
13.05	PhD lecture by Pernille Heyckendorff Lilholt
13.50	Break
14.00	Questions and comments from the Committee Questions and comments from the audience at the Moderator's discretion
16.00	Conclusion of the session by the Moderator

After the session a reception will be arranged in the Foyer, Niels Jernes Vej 14