



Physiotherapy education and training prior to upper abdominal surgery is memorable and has high treatment fidelity: a nested mixed-methods randomised-controlled study

Ianthe Boden^{a,b,c,*}, Doa El-Ansary^b, Nadia Zalucki^a, Iain K. Robertson^{c,d},
Laura Browning^{b,e}, Elizabeth H. Skinner^b, Linda Denehy^b

^a Physiotherapy Department, Launceston General Hospital, P.O. Box 1963, Launceston, 7250, TAS, Australia

^b Department of Physiotherapy, School of Health Sciences, The University of Melbourne, Alan Gilbert Building, 161 Barry Street, Carlton, 3053, VIC, Australia

^c Clifford Craig Foundation, Launceston General Hospital, P.O. Box 1963, Launceston, 7250, TAS, Australia

^d School of Health Sciences, University of Tasmania, Locked Bag 1320, Launceston, 7250, TAS, Australia

^e Division of Allied Health, Western Health, Furlong Road, St Albans, 3021, VIC, Australia

Abstract

Objectives To (1) assess memorability and treatment fidelity of pre-operative physiotherapy education prior to elective upper abdominal surgery and, (2) to explore patient opinions on pre-operative education.

Design Mixed-methods analysis of a convenience sample within a larger parallel-group, double-blinded, randomised controlled trial with concealed allocation and intention-to-treat analysis.

Setting Tertiary Australian hospital.

Participants Twenty-nine patients having upper abdominal surgery attending pre-admission clinic within six-weeks of surgery.

Intervention The control group received an information booklet about preventing pulmonary complications with early ambulation and breathing exercises. The experimental group received an additional face-to-face 30-minute physiotherapy education and training session on pulmonary complications, early ambulation, and breathing exercises.

Outcome measures Primary outcome was proportion of participants who remembered the taught breathing exercises following surgery. Secondary outcomes were recall of information sub-items and attainment of early ambulation goals. These were measured using standardised scoring of a semi-scripted digitally-recorded interview on the 5th postoperative day, and the attainment of early ambulation goals over the first two postoperative days.

Results Experimental group participants were six-times more likely to remember the breathing exercises (95%CI 1.7 to 22) and 11-times more likely (95%CI 1.6 to 70) to report physiotherapy as the most memorable part of pre-admission clinic. Participants reported physiotherapy education content to be detailed, interesting, and of high value. Some participants reported not reading the booklet and professed a preference for face-to-face information delivery.

Conclusion Face-to-face pre-operative physiotherapy education and training prior to upper abdominal surgery is memorable and has high treatment fidelity.

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Keywords: Pre-operative care; Elective surgery; Clinical trial; Respiratory therapy; Patient education; Treatment fidelity

* Corresponding author at: Physiotherapy Department, Launceston General Hospital, P.O. Box 1963, Launceston, 7250, TAS, Australia.

E-mail addresses: ianthe.boden@ths.tas.gov.au (I. Boden), d.el-ansary@unimelb.edu.au (D. El-Ansary), nadia.zalucki@ths.tas.gov.au (N. Zalucki), iain.robertson@utas.edu.au (I.K. Robertson), laura.browning@wh.org.au (L. Browning), drlizzieskinner@gmail.com (E.H. Skinner), l.denehy@unimelb.edu.au (L. Denehy).

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Introduction

A postoperative pulmonary complication (PPC) is the most common complication following upper abdominal surgery (UAS) [1], increasing mortality [2] and hospital costs [3]. Preventing PPC is a key component of acute-care physiotherapy [4]. Breathing exercises can reverse respiratory pathophysiological effects of anaesthesia and surgery [5], although their overall effectiveness to prevent PPC is uncertain [6]. This paradox may possibly be due to inadequate dose-response or delayed initiation following surgery [7]. The first physiotherapy session is commonly more than 30 hours after surgery [8], which may be too late as 15% of PPC have occurred within this time [2,8]. Conceivably, timeliness of initiation and dose frequency could improve if patients are educated and trained *before* surgery to perform hourly breathing exercises immediately following surgery. Pre-operative education is strongly recommended within Enhanced Recovery After Surgery guidelines [9] although little evidence exists demonstrating that pre-operative education is understood by patients, translates into behavioural change, and results in improved postoperative outcomes.

Lung Infection Prevention Post Surgery Major Abdominal with Pre-Operative Physiotherapy (LIPPSMAck-POP) is a randomised controlled trial [10] rigorously testing the hypothesis that pre-operative physiotherapy education and training prevents PPC following UAS. The intervention is a behavioural intervention. A positive outcome could only be expected if the intervention is differentiable from standard care, is memorable, and adhered to by the patient [11]. This is referred to in the literature as treatment fidelity [12].

Treatment fidelity has four components [13]: (i) *Integrity*; was the treatment delivered as intended? (ii) *Differentiation*; did two treatments differ from one another as intended? (iii) *Receipt*; does the patient understand the treatments provided and are they equipped to perform them as intended?; and (iv) *Enactment*; does the patient enact the learnt skills and perform the intervention as intended?

We designed a nested study within LIPPSMAck-POP to test three treatment fidelity components of pre-operative physiotherapy education and training: differentiation, receipt, and enactment. The primary research questions were:

1. How memorable is physiotherapy education when provided within a multi disciplinary pre-admission clinic?
2. Is there a difference in recall of information when delivered by a physiotherapist compared to a booklet alone?
3. Does pre-operative education affect early postoperative ambulation performance?

A secondary aim was to conduct a preliminary exploration of patients' opinions on pre-operative information delivery.

Method

Design

This mixed-methods study was designed as a concurrent, nested, parallel-group, blinded (patient, assessor, analyst), randomised-controlled study within the larger LIPPSMAck-POP trial [10]. A convenience sample of consecutive LIPPSMAck-POP participants were concurrently recruited to participate in the mixed-methods study. Written informed consent was obtained for both trials.

Participants attended a multi disciplinary pre-admission clinic within six-weeks of surgery at an Australian government-funded tertiary regional hospital. Participants were seen by a nurse, surgeon, anaesthetist, physiotherapist, and, if required, a stomal therapist. Following surgery, mixed-methods trial participants were interviewed using semi-scripted open-ended questions at their bedside on the fifth postoperative day, or on day of hospital discharge, whichever occurred first. As opioid analgesia could affect mental clarity [14], interviews were deferred until this was ceased.

Interview questions were purposively developed for this trial by the lead author using expert clinical knowledge obtained from 16 years of educating and assisting abdominal surgery patients in postoperative recovery. Questions were designed to assess ability to recall and distinguish physiotherapy education from other health-professional interactions at pre-admission clinic. Questions progressively probed for degree of recall (repetition and dosage) and purpose for the prescribed breathing exercises. To prevent biasing interview responses, interviewers were unknown to participants, wore plain clothes without any physiotherapy professional identifying features, and introduced themselves as from the Department of Surgery requesting an interview about the participant's experience at pre-admission clinic.

Interviews were digitally recorded then transcribed verbatim by an independent assistant. Content was verified for accuracy, de-identified and then analysed via quantitative and qualitative methods by two physiotherapists not previously involved in the trial. Participants, postoperative physiotherapists, nursing and medical staff, interviewers, transcribers, and data analysts were masked to pre-operative group allocation.

Characteristics of participants and research staff

Participants

Inclusion and exclusion criteria are published elsewhere [10]. An additional mixed-methods study *a-priori* exclusion criterion was inability to be interviewed postoperatively.

Therapists, interviewers, and analysts

All researchers were female. Pre-operative interventions were delivered by a postgraduate qualified physiotherapist with 16-years acute-care experience or a fourth-year phys-

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