



## Research paper

# Patient participation in pulmonary interventions to reduce postoperative pulmonary complications following cardiac surgery



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## ABSTRACT

**Background:** Clinical interventions aimed at reducing the incidence of postoperative pulmonary complications necessitate patient engagement and participation in care. Patients' ability and willingness to participate in care to reduce postoperative complications is unclear. Further, nurses' facilitation of patient participation in pulmonary interventions has not been explored.

**Objective:** To explore patients' ability and willingness to participate in pulmonary interventions and nurses' facilitation of pulmonary interventions.

**Design:** Single institution, case study design. Multiple methods of data collection were used including preadmission ( $n = 130$ ) and pre-discharge ( $n = 98$ ) patient interviews, naturalistic observations ( $n = 48$ ) and nursing focus group interviews ( $n = 2$ ).

**Setting:** A cardiac surgical ward of a major metropolitan, tertiary referral hospital in Melbourne, Australia.

**Participants:** One hundred and thirty patients admitted for cardiac surgery via the preadmission clinic during a 1-year period and 40 registered nurses who were part of the permanent workforce on the cardiac surgical ward.

**Outcome measures:** Patients' understanding of their role in pulmonary interventions and patients' preference for and reported involvement in pulmonary management. Nurses' facilitation of patients to participate in pulmonary interventions.

**Results:** Patients displayed a greater understanding of their role in pulmonary interventions after their surgical admission than they did at preadmission. While 55% of patients preferred to make decisions about deep breathing and coughing exercises, three-quarters of patients (75%) reported they made decisions about deep breathing and coughing during their surgical admission. Nurses missed opportunities to engage patients in this aspect of pulmonary management.

**Conclusions:** Patients appear willing to take responsibility for pulmonary management in the postoperative period. Nurses could enhance patient participation in pulmonary interventions by ensuring adequate information and education is provided. Facilitation of patients' participation in their recovery is a fundamental aspect of care delivery in this context.

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## 1. Introduction

Worldwide, the notion of patient participation has been integrated into health care policy<sup>1</sup> and is proposed to play a role in improving the quality and safety of health care.<sup>2</sup> One aspect of acute care where patient participation is likely to impact on many patient

and organisational outcomes is in the context of post-cardiac surgical recovery. Cardiac surgery, that requires cardiopulmonary bypass, is associated with decreased pulmonary residual capacity, diaphragmatic dysfunction, impaired gas exchange and alteration in pulmonary defence mechanisms exposing patients to an increased risk of pulmonary complications.<sup>3</sup> Pulmonary complications include atelectasis and pneumonia and account for a substantial increase to length of stay, associated cost and morbidity and mortality<sup>4</sup> and have been reported to occur in 8–79% of patients following cardiac surgery.<sup>5</sup> Pulmonary complications are considered

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modifiable adverse events and the incidence of pulmonary complications is used as a measure of the quality and safety of care.

Various interventions have been recommended to decrease the risk of pulmonary complications following surgery.<sup>4,6</sup> One intervention is patient-performed pulmonary exercises in the form of deep breathing and coughing where the goals are the improvement of pulmonary function via lung expansion and enhanced mucous clearance.<sup>7</sup> In recent years, the benefit of performing prophylactic, voluntary, pulmonary exercises has been questioned from a physiological perspective,<sup>8–10</sup> however deep breathing and coughing exercises remain a common respiratory intervention following cardiac surgery.<sup>11–13</sup>

Findings of a recent study suggest use of a standardised postoperative care program emphasising patient education, early mobilisation and pulmonary interventions, reduced the incidence of postoperative pneumonia and unplanned intubation of patients.<sup>14</sup> The performance of pulmonary interventions including deep breathing and coughing exercises requires patient participation yet patients' ability and willingness to participate in pulmonary interventions is unclear. Further it is not known how nurses facilitate deep breathing and coughing exercises though it is clear that explaining their importance, ensuring correct technique, and providing adequate pain relief<sup>11–13</sup> are vital related activities.

The study reported in this paper is situated within a large mixed methods exploration of the enactment of patient participation following cardiac surgery. Patient participation in medication and pain management has been reported previously.<sup>15,16</sup> The aim of this paper was to explore patients' ability and willingness to participate in pulmonary interventions and nurses' facilitation of participation in pulmonary interventions.

The specific research questions were:

1. Do patients know the importance of deep breathing exercises and coughing, the technique for performing deep breathing exercises and coughing, and the need for adequate pre-exercise analgesia?
2. What is patients' preference for participation in deep breathing and coughing exercises?
3. Is patients' experience of participation in deep breathing and coughing exercises commensurate with their preferred participation in deep breathing and coughing exercises?
4. How do nurses facilitate patient participation in deep breathing exercises and coughing?

## 2. Methods

To explore patient participation in pulmonary interventions to reduce postoperative pulmonary complications following cardiac surgery, a mixed-method approach was used in a single institution, case study design. Case study is "the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances"<sup>17</sup> and is the method of choice when a contemporary phenomenon, such as patient participation, is located within a real-life context.<sup>18,19</sup>

### 2.1. Setting and participants

This study took place in the cardiac surgical ward of a major metropolitan, tertiary referral hospital in Melbourne, Australia. Multiple methods of data collection were used including semi-structured patient interviews, naturalistic observations based on the tenets of qualitative exploratory descriptive research<sup>20</sup> and focus group interviews with registered nurses. The inclusion criterion for patients was scheduled elective cardiac surgery including coronary artery bypass graft/s and/or valve replacement at the

hospital site. Patients below 18 years of age were excluded. The study was reviewed and approved by the Human Research Ethics Committees of the hospital where data were collected and the overseeing university. One-hundred and thirty patients (99.2%) scheduled to undergo cardiac surgery who presented to the pre-admission clinic were recruited and provided consent to participate in interviews and observations for the study between April and December 2008. Forty nurses who were permanent staff on the cardiac surgical ward consented to participate in the 48 observation periods and focus group interviews.

### 2.2. Semi-structure patient interviews

To elicit patients' understanding of deep breathing and coughing exercises and their preference and experience of participating in these exercises, patients were interviewed twice between April 2008 and April 2009: during the pre-admission period and prior to discharge from hospital after their surgery. Pre-discharge interviews were conducted on the day of planned discharge from hospital. Depending on the urgency for surgery, the time between patients' pre-admission appointment and surgical intervention varied and not all patients who attended pre-admission clinic went on to have surgery. Consequently, 75% of patients ( $n=98$ ) at pre-admission were interviewed following surgery. Patients who were not interviewed had either undergone surgery at another hospital ( $n=13$ ), were still waiting for surgery ( $n=16$ ), or had withdrawn from surgery ( $n=3$ ).

For this study, behaviours proposed to be indicative of patient participation in voluntary pulmonary exercises and nurses' facilitation of these exercises were: (1) patients' preference and reported participation in deep breathing and coughing exercises; (2) patients' knowledge of the importance of deep breathing and coughing exercises; (3) demonstration by nurses, and use by patients, of the correct technique when performing deep breathing and coughing exercises, and (4) the administration of adequate analgesia by nurses.

As such questions that provided structure for the interviews were guided by three main topics:

1. The importance of deep breathing and coughing
2. The technique for deep breathing and coughing
3. The requirement for adequate pain relief in order to deep breathe and cough

Patients' ability to answer questions about deep breathing and coughing exercises was judged by the researcher to be 'known' or 'not known'.

Patients' preference for and reported participation in pulmonary management was elicited using the Control Preference Scale (CPS).<sup>21</sup> The CPS was developed to measure how treatment decisions are made among people with life threatening illnesses. The control preferences are defined by the creators of the scale as "the degree of control an individual wants to assume when decisions are being made about medical treatment"<sup>21</sup>, p. 21 and has been validated in varying contexts.<sup>22–25</sup> The CPS consists of five statements that each portray a different role in treatment decision making using a preference statement.<sup>21</sup> These roles range from active where the patient makes the decisions, through to shared where the patient makes decisions jointly with clinicians, to passive where clinicians make the decisions. For this study the word 'physician' was changed to 'clinician' to ensure all members of the health care team were considered by the patient when allocating a decision role. Patients' preference for participation in pulmonary management was elicited by providing patients with five preference statement cards in random order separately. Patients were asked:

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