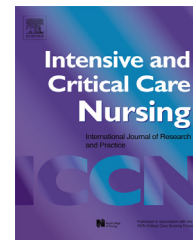




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REVIEW

Intensive care readmission: A contemporary review of the literature



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Summary ICU readmissions are a commonly used quality measure but despite decades of research, these adverse events continue to occur. Of particular concern is that readmitted patients have much worse prognoses than those not readmitted. In recent years new clinical service roles have evolved to assist ward staff with the care of acutely ill patients, such as those discharged from ICU. Given the recent emergence of these service roles, a review of contemporary ICU readmission studies was warranted to determine their impact on this adverse event.

Reviewed studies indicated the incidence of readmissions and outcomes of these patients have changed little in recent years. Few studies mentioned whether clinical service roles existed to support ward staff caring for patients recently discharged from ICU. Future research needs to focus on identifying modifiable factors in care processes to reduce the incidence and outcomes of this adverse event and to determine how clinical service roles can best help prevent its occurrence.

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Introduction

Patients admitted to Intensive Care Units (ICU) are of the highest acuity, requiring management with life support technologies and aggressive interventions to sustain life and

progress towards a clinically stable condition (Watts et al., 2007). The demand for intensive care services is escalating worldwide and being driven by increasingly sophisticated technology, increasing numbers of older patients with comorbidities and increased consumer expectations (Williams et al., 2010a). Due to the costs associated with intensive care provision and the scarcity of these resources, in recent years significant attention has been given to ICU quality measures (de Vos et al., 2007; McMillan and Hyzy, 2007). These measures can be assessed in numerous ways including risk-adjusted outcomes, incident monitoring and access indicators (Hewson and Burrell, 2006).

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Implications for Clinical Practice

- Having survived a critical illness, many post-ICU patients are at risk of readmission to ICU.
- Older patients with co-morbidities are at greater risk of ICU readmission than others.
- The specific factors contributing to or associated with ICU readmission are not clear. Ward staff caring for post-ICU patients should monitor these patients closely to ensure progress towards desired clinical outcomes.

One of the more frequently cited ICU quality measures is readmission to ICU during the same hospitalisation. These events are a significant concern because they carry greater risk for adverse outcomes than other types of ICU admissions (Schorr, 2012). Furthermore as they are considered a marker of ICU and hospital care quality, ICU readmissions may be used for resource allocation or to compare performance between ICUs (Berenholtz et al., 2002; Halpern, 2011).

Two reviews of ICU readmission research were published in the last decade (Elliott, 2006; Rosenberg and Watts, 2000). The reviews found on average 7% of patients are readmitted to ICU and primarily for respiratory and cardiac reasons. Readmitted patients had poorer prognoses, were older and more acute on their first ICU admission than those not readmitted; they also had higher mortality rates than non-readmitted patients. Some of the reviewed studies suggested that abnormal vital signs at the time of ICU discharge may be predictive of readmission but it is unclear if ward staff act upon these. No clear causes or risk factors for readmission were identified in the two reviews and despite three decades of research, the factors leading to unplanned ICU readmission are still not clearly understood (Baker et al., 2009). This may be because risk factors for ICU readmission have not been well studied or are not reproducible (Zimmerman, 2008).

During the period in which the reviews were published, a number of clinical resources evolved to assist ward staff with the care of acutely challenging patients including those recently discharged from ICU. The new resources developed out of necessity as post-ICU patients are a high risk group for adverse events due to their complex care needs (Chaboyer et al., 2008). Ideally, ICU readmission is avoided by monitoring post-ICU discharge progress and promptly recognising when patients are unwell or in a deteriorating condition so as to permit appropriate interventions (Williams et al., 2010b).

The new clinical resources aim to achieve this and include ICU Liaison Nurses, Medical Emergency Teams and Critical Care Outreach Teams (Endacott and Chaboyer, 2006; Green and Edmonds, 2004; MERIT Study Investigators, 2005). A recent study found that ICU Liaison Nurses now exist in 27% of Australian hospitals which have an ICU and that these Nurses have a positive impact on patient outcomes (Athifa et al., 2011; Elliott et al., 2012; Endacott et al., 2010). There is also evidence of the positive impact of Medical Emergency and Critical Care Outreach Teams (Chen et al., 2009; Endacott et al., 2009).

Aim

Given the growing popularity of these new clinical support services and the impact they seem to have on patient

outcomes, a review of contemporary ICU readmission research is warranted. The aim of this review is to determine if the nature or characteristics of ICU readmissions have changed in recent years, in light of the new clinical support services. The specific questions addressed by the review are:

- I. What is the incidence of ICU readmission?
- II. What are the risk factors for ICU readmission?
- III. What are the characteristics and outcomes of patients readmitted to ICU?
- IV. Is there evidence in the literature of the new clinical support services influencing ICU readmissions?

Methods

A search was conducted of the electronic databases Medline, CINAHL, PubMed and Scopus for publications from 2006 onwards. Key search terms were: intensive or critical care; readmission; recidivism; and discharge. Inclusion criteria were research based publications on adult ICU readmission and published after 2005 in English language peer-reviewed journals. This date was chosen as the most recent review of ICU readmissions was published in 2006 and therefore included studies prior to this date (Elliott, 2006).

Abstracts from intensive care conferences were also searched via professional bodies' websites and publications. These included the Australian College of Critical Care Nurses, British Association of Critical Care Nurses and the Society of Critical Care Medicine. Some of these sites contained links to each organisation's professional journal; these were also searched for relevant publications. Reference lists of identified studies were also reviewed to locate further studies not found by the search strategy. Exclusion criteria were studies on paediatric or cardiac ICU patients and those not published in English.

Literature identified by the search strategy was appraised using guidelines for determining methodological quality; this helped to establish whether to include identified studies in the review (Greenhalgh, 2010; see Table 1). Studies were assessed by a single reviewer. Studies chosen for inclusion were then ranked using national guidelines, to rate their evidence level (NHMRC, 2008; see Table 2).

Findings

After inclusion and exclusion criteria were applied, thirty-five studies were identified for review. The research methods used included case control studies and prospective observational studies. The most popular method was retrospective review of prospectively collected clinical data. Sample sizes ranged from 205 to 263,082 patients (see Table 3). Varying definitions of ICU readmission were used

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