Intensive and Critical Care Nursing (2015) 31, 83—90

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/iccn

The impact of a nurse led rapid response system on adverse, major adverse events and activation of the medical emergency team

Debbie Massey[a,*], Leanne M. Aitken[b,c,d,e,1], Wendy Chaboyer[a,e,2]

[a] School of Nursing and Midwifery, Griffith University - Gold Coast campus, Parklands Drive, Southport, QLD 4215, Australia
[b] School of Nursing and Midwifery, Griffith University — Nathan campus, Kessels Road, Nathan, QLD 4111, Australia
[c] Intensive Care Unit, Princess Alexandra Hospital, Ipswich Road, Woolloongabba QLD 4102, Australia
[d] School of Health Sciences, City University London, London, United Kingdom
[e] NHMRC Centre for Research Excellence in Nursing (NCREN), Griffith Health Institute, Griffith University, Australia

Received 15 May 2014; received in revised form 9 July 2014; accepted 25 November 2014

KEYWORDS
Ramp up rapid response system;
After-hours;
Patient safety;
Adverse events;
Major adverse events

Summary
Aim: To identify the relationship between one example of a rapid response system (RRS), specifically, an after-hours Clinical Team Co-Ordinator (CTC), and the incidence of Medical Emergency Team (MET) activations and, adverse and major adverse events in medical patients.
Method: A retrospective chart audit of patients' medical records was undertaken. The intervention group consisted of 150 randomly selected medical patients admitted during three months after the introduction of the CTC after-hours service. The control group consisted of 150 randomly selected medical patients admitted before the introduction of the after-hours CTC service. Multiple logistic regression was used to determine which of the potential predictors, along with the after-hours CTC service, were associated with adverse and major adverse events.
Results: A total of 130 patients ($n = 63$, 42% control; $n = 67$, 45% intervention) exhibited physiological abnormalities that should have activated the MET yet it was only activated five times. In total there were 69 adverse events ($n = 32$, 21% control; $n = 36$, 25% intervention) and 25 major

* Corresponding author. Tel.: +61 7 555 27855.
E-mail addresses: d.massey@griffith.edu.au (D. Massey), l.aitken@griffith.edu.au (L.M. Aitken), w.chaboyer@griffith.edu.au (W. Chaboyer).
[1] Tel.: +61 7 3176 7256.
[2] Tel.: +61 7 555 28518.

http://dx.doi.org/10.1016/j.iccn.2014.11.005

adverse events ($n = 7$, 5% control; $n = 18$, 12% intervention). There were more adverse and major adverse events identified after the introduction of the CTC after-hours service. Changes in heart rate and reduction in Glasgow Coma Scores (GCS) were significant predictors of an adverse event. A low urine output and a drop of two or more in the GCS were significant predictors of a major adverse event.

Conclusions: The introduction of an after-hours CTC service in a specific clinical site was associated with an increase in the identification of adverse and major adverse events in medical patients. Further exploration of nurse-led rapid response systems should be undertaken in different clinical settings.

Background

The past decade has seen an increased focus on recognising and responding to deteriorating hospitalised patients (Australian Commission on Safety and Quality in Health Care, 2010; Institute of Healthcare Improvement, 2006; National Institute Clinical Excellence, 2010). Much of this interest has been prompted by findings that demonstrate patient deterioration is often not recognised or responded to in a timely manner (Hodgetts et al., 2002; Jacques et al., 2005). Failure to recognise and respond to patient deterioration and to escalate care has led to an increased risk of adverse events (AEs) and major adverse events (MAEs) in hospitalised patients that may have been avoided had appropriate care been instituted earlier (Buist et al., 2004). In response to this recognised threat to safe, high-quality care, a number of patient safety initiatives have been implemented. Rapid response systems (RRS) are an example of such safety initiatives.

RRS can incorporate either ''high capability teams'' or ''ramp up teams'' (DeVita et al., 2006). A high capability team is physician-led. The Medical Emergency Team (MET) is an example of a high capability team (DeVita et al., 2006). Ramp-up teams are primarily nurse-led (DeVita et al., 2006). Ramp up teams have been successfully implemented and well evaluated in the United Kingdom (Priestley et al., 2004; Watson et al., 2006). In Australia the after-hours Clinical Team Co-Ordinator (CTC) role is emerging as a ramp-up RRS (Williams et al., 2012). The after-hours CTC has been implemented to improve the care and management of the deteriorating patient in the hospital after-hours. However there is limited uniformity in how this service is operationalised or implemented and very little evaluation of the role has occurred. Formal evaluation was therefore required because empirical evidence would help in the understanding of whether this role influences patient outcomes.

Aims of the study

To identify the relationship between one example of an RRS, specifically an after-hours Clinical Team Co-Ordinator (CTC), and the incidence of Medical Emergency Team (MET) activations and adverse and major adverse events in medical patients.

Four research questions were derived from this overarching aim:

1. To what extent was the introduction of the after-hours CTC service associated with a reduction in AEs and MAEs in medical ward patients?
2. To what extent was the introduction of the after-hours CTC service associated with an increase in the activation of the MET?
3. To what extent was the implementation of the after-hours CTC service associated with a reduction in physiological abnormalities associated with life-threatening clinical deterioration?
4. What clinical factors predicted the occurrence of AEs and MAEs in medical patients?

Study design

In this study it was not possible to manipulate the independent variable because the after-hours CTC had already been introduced, therefore a non-experimental approach was taken. A causal-comparative study was undertaken (Johnson, 2001). Causal-comparative research, also known as ex-post facto research (Polit and Beck, 2006), aims to find a cause or explanation for existing differences between (or among) groups. Two or more existing groups are compared retrospectively. A retrospective medical record review of adult general medical ward inpatients whose hospital length of stay (LOS) was greater than two days was undertaken. Patients exposed to the after-hours CTC service (the intervention) were compared to patients not exposed to the intervention (the control).

Previous research demonstrates that inter-rater reliability of chart audits can be more than 80% with adequate training (Thomas et al., 2006). The reliability and accuracy of retrospective chart reviews has also been demonstrated in previous research examining the extent, nature, and consequences of adverse events (Chaboyer et al., 2008).

During the design of this research a number of steps were implemented to improve the validity of the data collection method, as suggested by Gearing et al., (2006). Once the research questions and study aims were prospectively defined the study design phase of the research, including the outcomes and predictors were clearly identified. Specific definitions of all study predictors were developed to optimise accurate and consistent data abstraction. The chart review and the data abstraction process was standardised through the use of a validated data abstraction form (Chaboyer et al., 2008; Woloshynowych et al., 2003).

Setting

The study was set at Gold Coast Hospital, Queensland; a 480 bed tertiary teaching hospital. The hospital had over 67,000 emergency presentations and over 70,000 overnight hospital admissions a year. The Gold Coast Hospital operated a