

Outreach and early warning systems for the prevention of intensive care admission and death of critically ill adult patients on general hospital wards?

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Background:

This is a commentary on a Cochrane review¹ concerning Outreach and Early Warning Systems for the prevention of Intensive Care admission and death of critically ill adult patients on general hospital wards. Many in-hospital deaths or other adverse events might be predicted and hence avoided because abnormal vital signs observations can be detected some six to 24 hours prior to an adverse event. However the clinical importance of these is often missed. This might be because staff do not recognise the clinical urgency, fail to seek advice, or lack knowledge or skills in resuscitation. Failure to recognise the severity of the patient's situation may result in unanticipated admission to Intensive Care, longer length of stay, cardiac arrest or death.

Different systems have been developed to 'track' patient physiology and 'trigger' to flag the deteriorating patient, including Early Warning Systems. Further action is then directed by hospital protocols, ranging from increased frequency of observations and alerting nurse in charge, to making an emergency call to a team with critical care competences ('outreach'). Outreach team names and composition vary by location; 'Critical Care Outreach Teams (CCOT)' or 'Patient At Risk Teams (PART)' are common in the United Kingdom, 'Medical Emergency Teams (MET)' in Australia, and 'Rapid Response Teams (RRT)' are used in the United States. Nursing staff play key roles in both the identification of deteriorating patients, and as part of the multidisciplinary outreach teams.

Objectives:

The primary objective of this review was to determine the impact of outreach services on hospital mortality rates.

Secondary objectives were to determine the effects of outreach services on Intensive Care Unit admission patterns (admissions and readmissions), length of hospital stay and the number of adverse events (unexpected cardiac or respiratory arrest) in adult patients who deteriorate on general hospital wards before and after the introduction of outreach services.

Intervention/Methods:

Interventions studied the implementation of outreach using Early Warning Systems to identify deteriorating patients versus ward-based care (i.e. plain observation charts) with no outreach. Early Warning Systems included the MET calling criteria (single parameter systems) and Patient At Risk (PAR) score (multi-parameter system). The primary outcomes were hospital mortality rates, unanticipated Intensive Care Unit admissions or readmissions, length of hospital stay, and adverse events such as cardiac or respiratory arrest in adult patients on general hospital wards.

This review considered randomized controlled trials (RCTs), controlled trials, controlled before and after studies and interrupted-time-series designs using published and unpublished data.

The authors searched eight electronic databases covering 1974 to mid-2006, and also reference lists of relevant articles and conference abstracts.

Database searches identified a total of 6,273 studies. Sixteen studies were identified as potentially eligible, but 14 were excluded because study designs did not meet inclusion criteria. Two RCTs met review inclusion criteria. Meta-analysis was not possible as the study designs and outcome measures differed between the two studies.

Results:

The included studies investigated different Early Warning Systems and outreach teams. The MERIT study² was a 12-month cluster RCT of general patient wards in 23 hospitals. Australian hospitals were randomised to implement outreach (MET) with an Early Warning System, or to the control case. The primary outcome was a composite score of cardiac arrest, unanticipated Intensive Care admission and unexpected death; this showed no significant difference. As a secondary outcome, there was no significant difference in the rate of unexpected death between study groups (1.18 versus 1.06 patients per 1000 admissions, adjusted p value 0.752).

The Priestley study³ was a prospective stepped-wedge RCT which phased in outreach (CCOT) and an Early Warning System (PAR score) in 16 acute adult general wards in a single non-teaching hospital in England. The primary outcome was in-hospital mortality rate which favoured the intervention (adjusted OR = 0.52; 95% CI 0.32 to 0.85).

Conclusion:

The majority of the excluded research evidence was based on before-and-after designs, which either lacked randomization or used historical controls. The review team considered that the two included studies might have been limited by possible contamination between intervention and control hospitals or wards. Findings were inconsistent, with Priestley³ reporting outreach reduced the number of hospital deaths while MERIT² found no differences between hospitals with and without outreach. The review concluded that it was not clear whether outreach reduced hospital deaths or ICU admissions; that future RCTs should be multi-centre (multi-hospital) trials and that outcomes should be standardized to facilitate comparison and meta-analysis of findings across studies.

Implications for practice:

Based on research in this review, minimal evidence was found in favour of adoption of outreach triggered by Early Warning Systems. However, the review was published nearly eight years ago, and the search is nearly ten years old. An update of this review is overdue and currently being undertaken; with a considerable amount of research having been carried out in the interim, a more informative update is anticipated.

Lack of research evidence does not necessarily mean that outreach services triggered by Early Warning Systems are not useful. Internationally, there are indications that clinicians consider they have benefit. Shortly after this review's publication, in England, National Institute for Clinical Excellence Clinical Guidance 50⁴ recommended 'Physiological track and trigger systems should be used to monitor all adult patients in acute hospital settings' to include measurement of heart rate, respiratory rate, systolic blood pressure, oxygen saturation and level of consciousness. In Australia, a National Consensus Statement⁵ outlined a national approach for recognition and response to the deteriorating patient. The training to

use an Early Warning System ensures that nurses understand the importance of compliance with timely observations, and enables them to convey vital information regarding a patient's condition in a structured way. The use of an Early Warning System can be empowering to the nursing role of taking and recording of patient's observations, communicating the situation and escalating patient care as required⁶.

References:

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