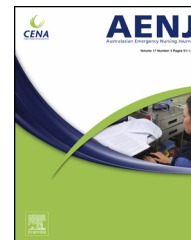




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RESEARCH PAPER

Is the Modified Early Warning Score able to enhance clinical observation to detect deteriorating patients earlier in an Accident & Emergency Department?



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KEYWORDS

Early warning system;
Modified Early Warning Score (MEWS);
Access block;
Clinical deterioration;
Nursing observation;
Clinical judgement

Summary

Background: Currently there is no study to prove the accuracy of any early warning system on a group of patients who are waiting for in-patient beds in emergency department (ED). The study objective is to compare the performances of detecting patient deterioration with and without using the Modified Early Warning Score for a group of patients who are waiting for in-patient beds in a public ED.

Methods: An observational study was conducted in a public ED in Hong Kong between January and March 2013. During this period, the Modified Early Warning Score (MEWS) was incorporated into current nursing practice for patient monitoring in selected days. Nurses then made decision according to the MEWS to notify senior nurses or senior doctors of patient deterioration. There was a comparison group with target patients being monitored without using the MEWS.

Results: A total of 545 patients were recruited, with 269 patients in the MEWS group. Using the MEWS for patient observation had a 100% sensitivity and a 98.3% specificity in detecting patient deterioration, while there was also a high sensitivity and a high specificity (100% and 97.8%) in the comparison group. The findings also showed that respiratory rate was a significant vital sign to detect patient deterioration.

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Conclusions: Using the MEWS for patient monitoring did not significantly enhance the performance in detecting patient deterioration for a group of patients who are waiting for in-patient beds in a public ED. However, the MEWS may be beneficial to less experienced nurses who have less clinical experience to identify patient deterioration.

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What is known

- The Modified Early Warning Score (MEWS) is well adopted by many western countries as part of patient risk management. Currently there is no study to prove the accuracy of any early warning system on a group of patients who are waiting for in-patient beds in emergency department (ED). This is the first Hong Kong study to evaluate the effectiveness of the MEWS to detect deterioration of access block patients in ED.

What this paper adds

- Incorporating the MEWS with nurses' clinical judgement for patient monitoring may potentially increase the chance to detect patient deterioration, particularly for less experienced nurses. Respiratory rate was found significant to discriminate between stable patients and patients at risk of deterioration. To improve patient safety, recording of respiratory rate should be encouraged.

Background

Overcrowding in emergency departments (EDs) is not only a challenging issue in Hong Kong, but also in many EDs over the world.¹ One possible reason for ED overcrowding is access block – unavailable in-patient beds.^{1,2} In Hong Kong, access block is particularly worse in several EDs of tertiary hospitals, possibly due to a shortage of in-patient capacity and the ageing population in those areas in Hong Kong. The admission rate and the length of stay in ED are also on the rise.³ When the length of stay of access block patients in ED is prolonged, the risk of clinical deterioration is increased since patients cannot receive further investigations and definitive treatment in ED.^{3,4}

Early recognition of clinical deterioration is crucial for access block patients. Evidence showed that changes in physiological parameters were often documented before patients were found unwell.^{5,6} Various early warning systems making use of patients' physiological parameters have been well established in different clinical settings in many western countries.^{7–10} However, there is no evidence showing that any early warning system is accurate in detection of patient deterioration for a group of patients who are waiting for in-patient beds in ED. Emergency nurses detect and respond to patient deterioration by vital signs checking and individual nurses' clinical judgement.

However, there are various factors that may affect nurses' decision making such as clinical experience, manpower and workload.¹¹

Of various early warning systems available in detecting patient deterioration, the Modified Early Warning Score (MEWS)¹² has been in use for more than a decade which is well adopted by western countries as part of patient risk management.⁵ The MEWS is based on data derived from four physiological readings (systolic blood pressure, heart rate, respiratory rate, body temperature) and the level of consciousness based on AVPU – Alert, responsive to Voice, responsive to Painful stimulation, and Unresponsive. The readings are compared to a normal range to generate a single composite score which is made up of the five parameters of the MEWS. [Table 1](#) shows the scoring system of the MEWS. The score ranges from 0 to 14, with an action pathway to be followed by nurses according to the score for decision-making. A higher score is shown to be associated with worse clinical outcome at different specialties including medical, surgery and orthopaedic unit.¹³ A score of 5 or more defines patients at high risk of deterioration and is statistically linked to an increased likelihood of death or admission to an intensive care unit.¹⁰

A number of studies on the MEWS were conducted at in-patient settings, commonly in medical and surgical wards.^{10,14–16} A Modified Pediatric Early Warning Score was developed to use in paediatric wards which adjusts to paediatric physiology.¹⁷ Based on a study to test the MEWS against clinical judgement in detection of critical illness in the pre-hospital environment, a potential augmenting effect was found when adding the MEWS to current clinical judgement for decision-making, particularly in medical pathology.¹⁸

There was a limited amount of study conducted on the MEWS within the ED environment. Two EDs developed their own early warning systems and were yet to be validated.^{19,20} Two studies focused on predicting medical, intensive care unit admission and death at the ED triage area which were conducted retrospectively.^{21,22} No study was found to evaluate serial measurements of the MEWS overtime for ED patients. A prospective cohort study in the authors' ED validated the effectiveness of the MEWS for a heterogeneous group of patients over time but it is done in the emergency medicine ward instead of the main ED patient area.²³ No study has been found to evaluate the effectiveness of the MEWS in ED for access block patients. This was the first study to adopt the MEWS for patient monitoring on access block patients in an ED in Hong Kong. The objective of this study was to compare the performances of detecting patient deterioration with and without using the MEWS for a group of patients who are waiting for in-patient beds in an ED.

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