

Attitudes of emergency department physicians and nurses toward implementation of an early warning score to identify critically ill patients: qualitative explanations for failed implementation

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CLINICIAN'S CAPSULE

What is known about the topic?

Early warning scores reduce morbidity and mortality by identifying patients at risk for deterioration on the medical wards.

What did this study ask?

This study sought opinions from emergency department (ED) staff on the use of early warning scores in the ED.

What did this study find?

Emergency doctors and nurses did not value early warning scores despite quantitative data showing efficacy in the ED.

Why does this study matter to clinicians?

We gleaned insight into how to implement a computer-based early warning score into the ED to reduce morbidity and mortality from septic shock.

of HEWS at the bedside, utility in communicating acuity and deterioration, and feasibility and accuracy of data collection. We also found 9 barriers and 7 enablers to the use of early warning score in the ED.

Conclusions: In our emergency departments, we identified potential barriers to implementation of an early warning score. A pre-existing expertise and lexicon related to critically ill patients lessens the perceived utility of an EWS in the ED. Understanding these cultural barriers needs to be addressed through change theory and implementation science.

RÉSUMÉ

Contexte: Il arrive parfois que la sepsie, une affection fréquente, qui exige un traitement rapide, passe inaperçue au moment du triage au service des urgences (SU). L'application d'une échelle de détection de signes précoces a permis d'améliorer le dépistage de la sepsie dans d'autres milieux.

Objectif: L'étude visait donc à dégager les perceptions qu'avaient le personnel infirmier et le personnel médical de l'échelle Hamilton Early Warning Score (HEWS) en association avec l'Échelle canadienne de triage et de gravité.

Méthode: L'étude consistait en des entretiens semi-directifs avec des infirmières, des résidents et des médecins traitants afin de recueillir leurs perceptions de l'échelle à différents égards : la faisabilité, l'utilité, la facilité, les obstacles, les réussites, les possibilités et l'exactitude. Les chercheurs ont fait appel à une démarche théorique fondée sur le constructivisme, et la transcription des échanges a nécessité l'utilisation d'arbres de codage thématique.

Résultats: Les participants, au nombre de 12, estimaient que l'échelle HEWS n'était pas utile au SU parce qu'elle ne les aidait pas à reconnaître les patients gravement malades. Les auteurs ont dégagé 5 thèmes : la connaissance de la sepsie et de l'échelle HEWS, l'utilité de l'échelle durant le triage au SU, l'utilité de l'échelle au chevet du patient, l'utilité de l'échelle

ABSTRACT

Background: Sepsis, a common, time-sensitive condition, is sometimes not identified at emergency department (ED) triage. The use of early warning scores has been shown to improve sepsis-related screening in other settings.

Objectives: Our objective was to elucidate nurse and physician perceptions with the Hamilton Early Warning Score (HEWS) in combination with the Canadian Triage Acuity Scale.

Method: Semi-structured interviews were conducted with nurses, resident physicians and attending physicians to explore perceived feasibility, utility, comfort, barriers, successes, opportunities and accuracy. A constructivist grounded theory approach was used. Transcripts were coded into thematic coding trees.

Results: The twelve participants did not value the HEWS in the ED because they felt it was not helpful in identifying critically ill patients. We identified five themes; knowledge of sepsis and HEWS, utility of HEWS in emergency triage, utility

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dans la communication du degré de gravité et de détérioration de l'état du malade ainsi que la faisabilité et l'exactitude de la collecte de données. Ont également été relevés 9 obstacles à l'application de l'échelle de détection de signes précoces au SU et 7 facteurs facilitants.

Conclusions: L'étude a permis de relever des obstacles possibles à l'application de l'échelle de détection de signes précoces dans les SU concernés. Une bonne connaissance

préalable des signes de gravité et l'utilisation d'un lexique en la matière ont atténué la perception du degré d'utilité de ce type d'échelle au SU. Il faudrait recourir à la théorie des changements et à la science de la mise en œuvre pour mieux comprendre et traiter les obstacles de type culturel.

Keywords: early warning score, emergency department, implementation, knowledge translation, sepsis

INTRODUCTION

Early warning scores (EWS) identify patients at risk of critical deterioration or death^{1,2} and are derived by scoring derangements in commonly measured physiological parameters. Many patients with elevated EWS have sepsis, a common and time-sensitive emergency department (ED) presentation and a major cause of morbidity and mortality.^{3,4} Sepsis is sometimes not identified during ED triage, leading to preventable death.⁵ Use in both medical and surgical wards is recommended, and evidence suggests that EWS are useful in the ED.^{5,6} The Hamilton Early Warning Score (HEWS; Appendix 1) is a predictor of critical in-patient events²; an elevated HEWS at the time of ED triage predicts sepsis.⁷ In 2015, we integrated an automatic calculation of HEWS into a digital triage and ED charting system, training nurses and physicians through meetings and in-services. This study assessed how ED staff perceived HEWS post-implementation.

METHODS

Participants

We intentionally sampled ED registered nurses (both triage and bedside), resident physicians, and emergency medicine attending physicians. Participation was voluntary, verbal consent was obtained, and no incentives were offered. Institutional ethics approval was obtained.

Data collection

Our interview guide was informed by both published literature and local experience. The guide (Appendix 2) was pilot tested with non-participating physicians and nurses and refined based on feedback. A single, trained interviewer recorded semi-structured interviews, which were subsequently transcribed by a trained medical transcriptionist and checked for errors by the original interviewer.

Data analysis

We analyzed data using a constructivist grounded theory,⁸ reviewing previous literature on implementation of clinical decision tools and risk stratification scores as sensitizing concepts. We used a constant comparative technique extracting themes as we went, constantly seeking out new or divergent themes as we collected data.⁹

Transcripts were reviewed by two qualitative researchers (BB and TMC) and coded into thematic coding trees, developing a codebook with definitions and relevant exemplary quotes. These investigators frequently met to refine the coding structure until consensus was reached. To ensure rigour, a third investigator (SS) listened to the interviews and conducted an audit of the trial; participants also reviewed the final themes and codes in a member check.

RESULTS

Twelve participants (five nurses, three residents, and four attending physicians), ranging in experience from 1 to 30 years, were recruited and interviewed, yielding 241 minutes of interview tape (median 27 minutes, range 5–62 minutes) and 98 transcript pages. We identified five themes: knowledge of sepsis and HEWS, utility of HEWS in emergency triage, utility of HEWS at the bedside, utility in communicating acuity and deterioration, and feasibility and accuracy of data collection. We then identified nine barriers and seven enablers for the use of EWS in the ED (Table 1). Our data analysis reached a point of sufficiency after 12 interviews.

Feasibility and accuracy of HEWS data gathering

Vital sign accuracy was generally thought to be high, although many acknowledged that certain vital signs (particularly temperature and respiratory rate) are often

Table 1. Barriers and enablers

Barrier	Supporting Quote
Sense of insult	"A lot of people felt a little bit put down by the HEWS score because it makes it seem like we didn't know how to do our jobs." (RN03)
Under-resourced	"I have 10 (acuity level 2 patients) in the waiting room. Which one of those patients gets my next available bed?" (SP01)
Redundant or not necessary	"HEWS tells (triage nurses) that the patient is sick, but they already know that the patient is sick. The challenge is convincing people that it catches things that we wouldn't catch independently." (SP01)
Forced function	"Some vitals are irrelevant" (RN03) (in the context of repeat vitals for patients on, for example, nitroglycerine infusions, for whom only blood pressure and heart rate are of interest, or when patients are sleeping, there is often no need to retake their temperature, but the system forces these values to calculate a score).
Lack of perceived efficacy	"It was implemented without very much evidence . . . we were just told to do it from a bureaucratic level and any kind of debate was just shut down pretty quickly . . . and that really affected buy-in." (SP05)
Pre-existing triage scale adequate	"I think that the CTAS [Canadian Triage and Acuity Scale] does a pretty good job already of identifying the acuity of patients. I don't see it as a big benefit." (RP05)
Strong working relationships between physicians and nurses	"I don't often feel I need a HEWS score to tell me that someone is changing or sick because the nurses we have [have] a relationship and they will tell me." (SP05)
Not part of ED lexicon; specific vital signs are discussed	"Well when I tell a physician a HEWS score is seven, the physician asks me 'okay well what are their vitals?' So I have to report the vitals anyway, HEWS is just kind of a waste of my time to tell them." (RN04)
Not patient-centred	"You have to wake the patient up hourly" to complete vital sign measures. (RN03)
Enabler	
Established lexicon with senior medical residents	"The [senior medical resident] shows up right away and asks 'what did I miss?'" (RN01)
Relevance to junior clinicians	"If it is a medical student then maybe the HEWS score is useful because it is forcing them to flag the patients and it forces them to actually call medicine and I guess I'm using medicine here or surgery to reassess their patients." (SP05)
Medicolegal protection; documentation standard	"It would be helpful for green (junior) nurses." (RN03) [paraphrased] Medicolegal protection for patients who spend hours in an emergency room bed then go to the ward and deteriorate. (RN01)
Provides a framework for calling the medical emergency team	"It acts as a buzzword to get attention" when a patient is deteriorating. (RN03)
Ease of use	[paraphrased] electronic data entry and auto-calculation and computer alerts make it a convenient score to calculate and trend, and the score itself, and its cut-offs and actionable responses are easily recalled.
Use in trending admitted patients	[paraphrased] when admitted patients are in the ED beyond a single clinician's shift, trends in HEWS scores may alert incoming clinicians to deterioration.
Success on medical wards	"I know it works on the wards." (SP01)

ED = emergency department; HEWS = Hamilton Early Warning Score; RP = resident physician; SP = staff physician; RN = registered nurse.

estimated if no specific clinical concern would prompt accurate measurement.

Knowledge of sepsis and HEWS

Participants were aware of vital sign changes in sepsis and the purpose of the HEWS score and were comfortable interpreting it. Vital signs were valued in the detection of sepsis, with temperature, heart rate, and respiratory rate being the most highly valued. The details of the HEWS scoring were not known by the

participants, but "cut scores" and trend patterns were well known by most.

Utility in the triage area

Participants felt that the HEWS score was not helpful for the assignment of a triage level because of strong clinical assessment skills and gestalt: "Sick is relatively common for us," said one physician (SP01). A registered nurse (RN04) stated, "We are able to identify what sick looks like and what abnormal vitals are."

Triage nurses universally felt that their clinical judgment already accounted for abnormal vital signs and that they had the gestalt abilities to contextualize abnormalities: “My critical thinking should come into play when I look at vital signs, so I really don’t need an additional tool to tell me that vitals are off” (RN04). RNs reported that their decision to upgrade or downgrade a patient’s triage level was based on vital signs, rather than the HEWS. One participant (RN03) stated, “I think when somebody brings you a patient and they are like, ‘oh, they’ve got a HEWS score of six,’ then there is an eye roll.”

Participants perceived that the sensitivity and specificity of the HEWS fared poorly. “The patient having a [heart attack] or a stroke may have pristine vital signs,” so HEWS is not “designed as a sorting tool, it is not designed to differentiate between which of these 30 patients you have to see next” (SP01). They said that a high HEWS was often a false alarm; they believe many abnormal vital signs could be explained with a clinical rationale such as a low oxygen saturation in a patient with chronic lung disease or a high heart rate in a patient with atrial fibrillation. Triage nurses also expressed that a low HEWS score may be falsely reassuring, such as in supraventricular tachycardia in which only the heart rate is abnormal, but the patient requires prompt care.

Utility of HEWS for bedside nurses

Nurses and physicians believed that HEWS was of limited value in the acute section of the ED because of their experience and skill in recognizing and caring for very sick patients: “We have highly experienced and highly trained nurses to know what is wrong with the patient” (SP04). Some nurses and physicians believed that the EWS might be of greatest benefit in the low-acuity (fast-track) area of the ED, where subtle deteriorations may not be recognized quickly: “I think the place where it is likely of the most use is in [rapid assessment zone]” (SP01).

Utility in communicating acuity and deterioration

Participants universally rejected HEWS as part of the ED lexicon for communicating: “I don’t think I have ever heard anybody have a conversation and say a HEWS score” (RN02); “HEWS is never at the forefront of my conversation with a physician” (RN04).

Physicians also expressed a lack of utility knowing just the score: “I want to know why the score is that way . . . the score itself isn’t helpful to me” (SP03).

RNs generally found HEWS helpful when calling senior medical residents (SMRs) or the most responsible patient for admitted patients boarding in the ED, though many surgical specialties were thought not to appreciate or understand the score: “the SMR will show up right away [and say] ‘What did I miss?’” (RN01).

DISCUSSION

Our results indicate unsuccessful ED implementation of an early warning score currently well accepted in other areas of our hospital. Despite implementing training and technology to integrate the score into triage and bedside functions, there appears to be a “culture clash.”

Three beliefs formed the basis of this rejection: 1) ED practitioners are expert at detecting patients with abnormal vital signs who are at risk of deterioration; 2) the standardized language of HEWS was unnecessary because of an existing lexicon to communicate acuity between doctors and nurses; and 3) they did not understand the science behind the score, nor the quality concerns of department leadership.

Clinicians in our study believed they are experts in determining if a patient is “sick or not sick.” There is some validity to this construct. There is evidence to support that experienced emergency physicians and nurses can rapidly predict the disposition of patients with a single look.^{10,11} ED physicians can predict acuity based on a triage note 75% of the time.¹² Despite strong intuitive abilities, ED patients can be at risk for unrecognized deterioration and death.^{13,14} A failure to recognize deterioration is the second-highest cost for hospital insurers in Canada.¹⁵

While an EWS can provide a succinct method of communicating a patient’s condition on a ward, this advantage was not felt to be too germane for the ED. Callen found that hospital subcultures can view new information technology with hostility,¹⁶ resulting in an apparent “culture clash.”

LIMITATIONS

Our study was conducted around a specific EWS implementation that could limit the transferability of our findings. The authorship team consists of physicians, and the single interviewer was a resident

physician from the same institution that might have influenced our interpretation of the data. There might also have been a tendency for certain types of volunteers to engage in this study, who might not have been representative of all clinicians.

CONCLUSION

ED clinicians believe that their expertise, an existing lexicon related to critically ill patients, and the current triage score lessens the utility of HEWS that is sufficient for patient safety. Nurses find EWS useful to communicate with admitting services. Effective integration of an EWS into the ED would require broader engagement of front-line clinicians.

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SUPPLEMENTARY MATERIAL

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