A quality improvement project to establish accuracy in completing Early Warning Score chart and appropriate clinical response depending on the score in acute care wards at Asiri Surgical Hospital

Nimali Lochanie[1], Kalsara Haresh Abeyasekara[2], Gayani Senanayaka[3]*

[1*]*Consultant Anaesthetist with special interest in Critical Care*

[2]*Medical Officer, Asiri Surgical Hospital*

[3]*Consultant Anaesthetist, Asiri Surgical Hospital*

Failure or delay in recognition of acutely deteriorating patients in acute care ward setting leads to preventable morbidity, cardiac arrest, and death. Assessment and responding to Early Warning Score (EWS) adapted from National Early Warning Score 2 is implemented at Asiri Surgical Hospital to capture these patients early and escalate their care appropriately. Though a colour-coded EWS chart and a hospital policy are available, gaps in accurate recording, monitoring, and triggering were reported. Thus, a quality improvement project was conducted with the aim of establishing more than 80% accuracy in completing the EWS chart and appropriate clinical response to EWS score in acute care wards at Asiri Surgical Hospital by August 2022.

A multidisciplinary team performed a series of Plan-Do-Study-Act cycles focusing on correct documentation and calculation of EWS score and appropriate monitoring and escalation of care. Key drivers for hindering the pathway were identified and addressed. Over the course of the project, correct recording improved from 81.25% to 99.4%, accurate calculation of total EWS score had improved from 79% to 88%, patients who received recommended monitoring as triggered by EWS score improved from 78.8% to 84.6% and escalation of care when EWS score is 5 or more improved from 70.9% to 91.7%.

A step improvement in the clinical response to a deteriorating patient in the acute care ward setting at Asiri Surgical Hospital was attained by the successful quality improvement project involving the frontline care providers.

Keywords: QI project, Early warning Score

Introduction

Failure to recognize physiological deterioration in acutely ill adults, combined with failure to seek appropriate help promptly results in increased rates of cardiac arrest and unanticipated ICU admissions.[1]

Early warning score (EWS) is a scoring system adapted from National Early Warning Score - United Kingdom (NEWS2) to identify acutely

deteriorating patients early including patients with sepsis.[2]

It is an integrated scoring system utilizing 6 physiological parameters routinely recorded at patient bed site. At the recommended trigger level for an urgent clinical response (EWS ≥5), EWS is more specific and sensitive over other scoring systems available to detect acutely deteriorating patients.[3,4]

NEWS is a strong indicator of increased risk of serious clinical deterioration and mortality in patients with sepsis and variety of acute medical illnesses, surgical patients and trauma.[5]

Colour coded EWS chart together with a detailed guideline has been introduced to Asiri Surgical Hospital (ASH) in 2017 to recognize the acutely deteriorating patients and intervene promptly to prevent undue delay in admission

to a critical care facility and prevent in hospital cardiac arrests.

This was with the aim of standardizing the assessment of acute illness severity and creating a common language of communication across the hospital.

However, outcome can only be improved if staff complete the EWS chart fully, calculate the score accurately, monitor according to the protocol and establish care according to clinical response. The enables the right person to be in right place first time.[6]

Once the patient is referred to the rapid response (RRT) team, there is a well structured system where Resuscitation Officer (RO) attends the patient within 15 minutes and discuss about the patient with critical care doctor or critical care consultant as required. However, gaps in recording and appropriate response to EWS score by acute care ward staff were reported by RO s and critical care team at ASH. There were no previous audits or studies done addressing this issue in our hospital. This warranted initiation of a quality improvement project to establish accuracy in completing EWS chart and appropriate clinical response depending on the score in order to enhance early identification and escalation of care for acutely deteriorating patients in acute care ward setting at ASH.

Methodology

SMART aim

Establish more than 80% accuracy in completing EWS chart and appropriate clinical response to EWS score in acute care wards at ASH by August 2022.

Quality improvement measures identified

We identified 3 process measures and 3 outcome measures of correct practice and escalation of care.

Process measures –

1. Presence of EWS chart in all case notes

2. Accurate reading of all 6 physiological parameters

3. Accurate calculation of total EWS score

Outcome measures -

1. Percentage patients who received recommended monitoring according to protocol as triggered by EWS score

2. Percentage patients who received escalation of care when EWS is more than 5

3. Percentage patients with EWS score more than 7 who have not received critical care referral

Quality Improvement project

A model of improvement quality improvement strategy was applied.

Pre-intervention data collection was done in June 2022 as a baseline assessment as there were no data from previous audits related to our interest area. 24 randomly selected patient notes and EWS charts were assessed in acute care wards in ASH to assess the existing standard of assessment, calculation of EWS score, monitoring according to the protocol and escalation of care according to clinical response. This was done by junior doctors and data was filled in a proforma. The data was presented in a monthly education meeting and standardization of ICU meeting. The meeting was attended by the hospital medical director, chief nursing officer, assistant chief nursing officers, medical officers and nurses. We discussed barriers to accurate recording and correct clinical response to EWS. Lack of knowledge among junior staff, work overload, busy wards, busy RRT, and unavailability of EWS charts in the notes were identified as contributors.

A training session was conducted to improve the knowledge and attitude on accurate assessment and correct clinical response to EWS score. This was followed by a simulation session taking 3 clinical scenarios.

A self-administered questionnaire was given pre and post teaching to check the attitude and knowledge of EWS and appropriate clinical response.

Ward in charges were educated upon emphasizing the importance of accurate response to EWS during daily hugs and effective handover of EWS during change of shifts.

Presentation on EWS was uploaded to P drive to be available in all ward computers so that the nursers can go through it at their convenience. Access to the module was monitored remotely and reminders were given to wards when compliance was poor.

Importance of allocating a duty resuscitation Officer (RO) for every shift was emphasized despite staff shortage to maintain quality of care. We appreciate the due respect given by the nursing in charge in this regard.

Resuscitation officers were advised to do ongoing monitoring and report errors in practice, advice ward staff when they identify gaps then and there.

Prospective data collection was done after all these steps by junior doctors to assess the improvement monthly.

Results

Process measures

1. In both the initial and second PDSA cycles, the EWS chart

was present with all patient notes which was commendable. This shows that the system is geared for improvement from the time the patient reaches the hospital.

2. Correct recording of all 6 physiological parameters has improved from 81.25% to 99.4%.

3. Accurate calculation of total EWS score has improved from 79% to 88%.

Outcome measures

1. Patients who received recommended monitoring as triggered by EWS score improved from 78.8% to 84.6%.

2. Escalation of care when EWS score is 5 or more improved from 70.9% to 91.7%.

3. There were no patients with EWS 7 or more which we believe means that they were escalated to a critical care facility appropriately.

Nursers were used to mark both systolic and diastolic blood pressure before the intervention which improved by 100% during the second PDSA cycle.

Documentation of the O_2 flow rate improved by 33% but there is still space for improvement in accurate documentation of the O_2 flow rate and crossing off the not in use SpO2 scale.

The mean score for the test of knowledge improved significantly ($p < 0.01$) from 59% to 69% pre- vs. post-training.
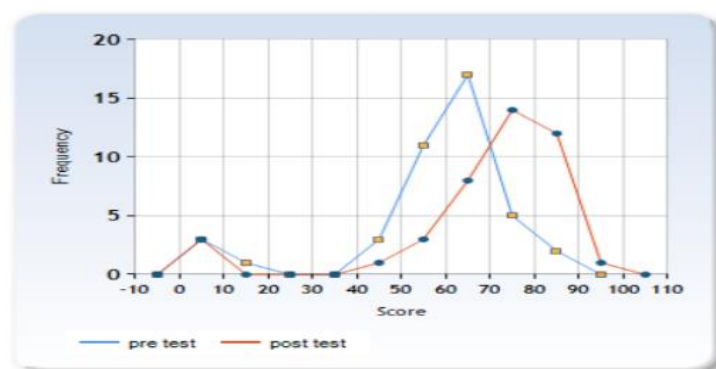
Figure 1: *Frequency polygon of the marks obtained pre and post-education.*

Discussion

A timely approach to preventable critical illness, cardiac arrest and death is getting increasing attention worldwide. Most of these patients will show a deterioration in physiological parameters beforehand which is the window of opportunity to intervene. EWS score is a validated track and trigger system to detect these deteriorating patients.[2] Even though the EWS chart and protocol were implemented 5 years back to ASH, gaps in compliance with correct recording, calculation and appropriate response were reported. The QI project was conducted with the aim of establishing more than 80% accuracy in completing the EWS chart and compliance with the protocol to trigger appropriate clinical response by August 2022.

Following the QI project we observed a significant overall improvement in the standardized approach to assessment, calculation of scores and compliance with protocol on monitoring and escalation of care. Accurate recording improved remarkably from 81.25% to 99.4%. Accurate calculation improved from 79% to 88%. Error in human calculation could have been eliminated if the recording system was computer-based. Patients who received recommended monitoring as triggered by EWS score improved from 78.8% to 84.6% and escalation of care when EWS score is 5 or more improved from 70.9% to 91.7%. These results demonstrate a remarkable improvement in working practices following the QI project.

No patients with EWS 7 or more were present in the wards during both PDSA data collections, which we believe is due to them being escalated to critical care appropriately. The presence of EWS chart with every set of patient notes is also a commendable finding that shows the system is geared for improvement from the time the patient reaches the hospital.

Many QI projects done around the world have demonstrated improvement in early recognition and response to patient deterioration following similar interventions like staff training, increasing availability of expert support, introduction of electronic methods for data collection etc.[7,8]

Documentation of the Oxygen flow rate accurately and crossing off the not-in-use SpO2 scale did not reach the expected level of improvement. This needs further emphasis in future projects.

Progressive data collection by RO nurses and 3 monthly snapshot audits are arranged to improve the sustainability of the project.

Monitoring access to the presentation on EWS on P drive in ward computers at regular intervals and making it a compulsory requirement for annual compliances is recommended. Hospital education and training manager is tracking the progress of this.

There were lot of strengths in this project. We identified the route courses for failure to document and escalate care of critically ill patients within the system by discussing with relevant team members and approached as a team to overcome barriers. We received remarkable support from all stages of staff in organizing teaching programs with very good attendance. They were keen to learn and willing for improvement. Data we collected are the ones routinely plotted in EWS charts, so it could be done while at work without dedicating separate time for it. We experienced a significant improvement in identification of deteriorating patients with all these interventions and we have a future plan for its sustainability.

The limitations we identified were data collection by several junior doctors which may have contributed to sampling bias.

We have few suggestions for improvements in the future. A second stage quality improvement project linked to ours by sampling EWS charts from patients in critical care units who got admitted as triggered by high EWS score is highly recommended. This will enable to find whether expert support was delivered in a timely manner. i.e, How much

time was taken for RO nurse and doctor to assess the patient once triggered and time taken for patient to arrive at a critical care unit once triggered by a EWS more than 7.

Introducing an electronic record system of vital signs enabling accessibility to all relevant teams when a patient deteriorates is an improvement way forward. This will be more convenient for future PDSA cycles as well.

Improving safe communication across care pathways with patients and families with proper documentation at each clinically significant decision-making process will strengthen the care delivered and will create a safety culture for both patients and staff.

Conclusion

The quality improvement project to establish accuracy in completing the EWS chart and appropriate clinical response depending on the score in acute care wards at ASH highlighted the importance of respecting the suggestions of the team and knowledge and will to improve a system to improve quality care delivered to patients. Leadership to support a culture of safety and well-being of patients and staff, regular PDSA cycles with new implementation strategies will enable sustained improvement in medical and nursing working practices.

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