

Role of Early Warning Scores and Nurse Interventions in Cardiac Arrest Prevention: Aligning with SDG 3

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ABSTRACT

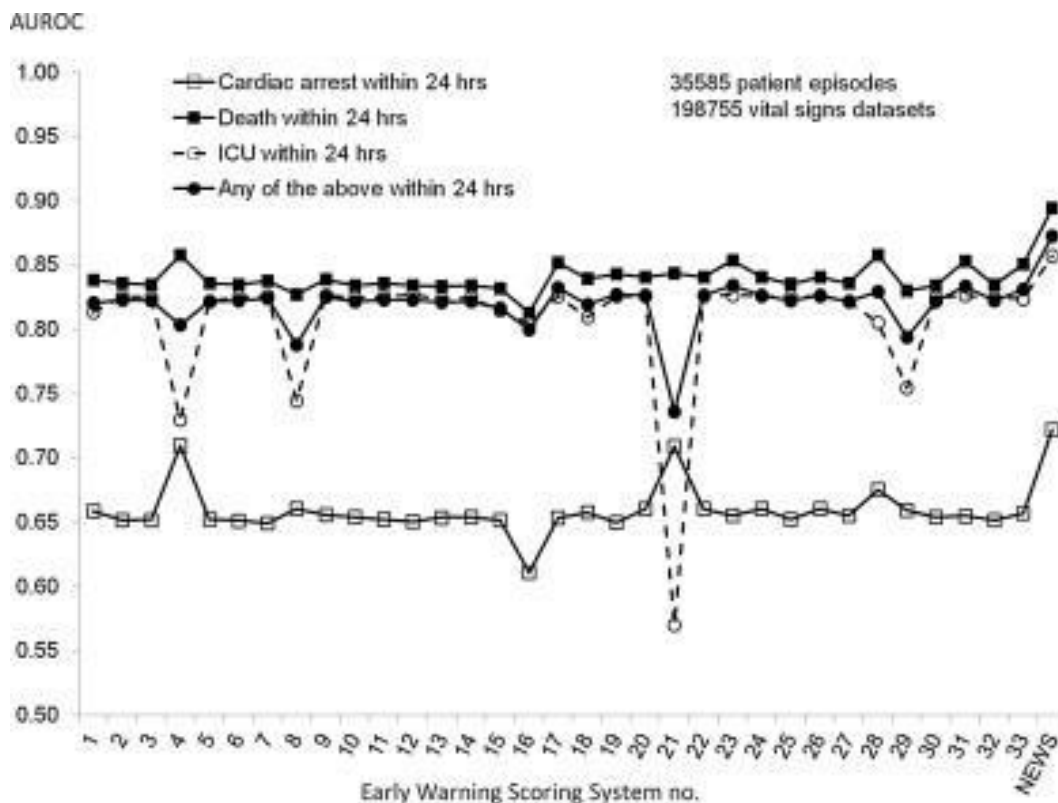
Cardiac arrest remains a leading cause of morbidity and mortality in hospitalized patients, often preceded by subtle but measurable physiological deterioration. Early Warning Scores (EWS) have been developed to facilitate early recognition of such deterioration through structured monitoring of vital signs. This paper examines the role of EWS and nurse interventions in preventing cardiac arrest, drawing on evidence from existing literature. The findings suggest that systems such as the Modified Early Warning Score (MEWS) and National Early Warning Score (NEWS/NEWS2) are effective tools for predicting adverse events. Nurses play a central role in implementing these systems, serving as frontline professionals who calculate scores, monitor patients, and escalate care when necessary. Integration of EWS into routine practice, supported by training, clear escalation protocols, and electronic monitoring systems, has been associated with improved patient outcomes and reduced preventable cardiac arrests. However, barriers such as workload pressures, inconsistent adherence, hierarchical constraints, and disparities across healthcare settings limit effectiveness. The study concludes that the success of EWS depends not only on the accuracy of the tool but also on the empowerment of nurses, institutional support, and a culture of patient safety.

KEYWORDS: Early Warning Scores, Nurse interventions, Cardiac arrest prevention, Patient safety, Rapid response, Critical care, SDG 3 (Good Health and Well-being)

How to Cite: Samuel Ernest, Nichapa Yonchoho, Ammar Jabbar Majeed, Hamdoni K. Pangandaman, (2025) Role of Early Warning Scores and Nurse Interventions in Cardiac Arrest Prevention: Aligning with SDG 3, Vascular and Endovascular Review, Vol.8, No.3s, 383-392.

INTRODUCTION

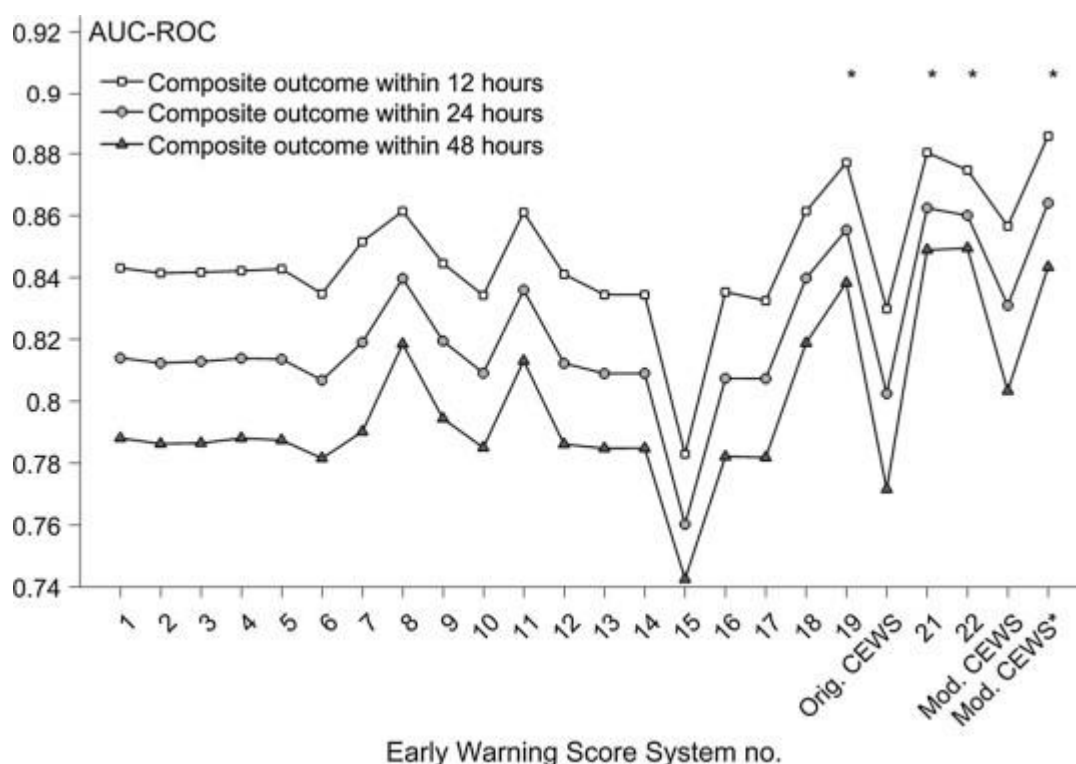
Cardiac arrest is one of the most common causes of death in hospitals and more often it is the last phase after a chain of negative consequences to the patient. Despite medical progress in areas of medical technologies and critical care, there is a clear picture of specific physiological changes that most patients develop hours before a cardiac arrest, which can be detected to improve final outcomes with an early intervention. Such awareness resulted in the formulation and subsequent use of Early Warning Scores (EWS), a series of systematic tools to be able to identify the patients at risk of clinical deterioration due to the continuous monitoring of vital signs. The contribution of nurses is central in this exercise because they are the healthcare providers who can first notice minor changes in the physiology of patients (Burke and Conway, 2023). Nurses can use the EWS systems to convert bedside assessments into a quantifiable risk score and increase the timely passage of care and rapid response team activation. Extensive literature has demonstrated that through EWS-guided structured nurse interventions, earlier detection of patient deterioration, a decrease in unplanned admissions to intensive care units, and ultimately, fewer in-hospital cardiac arrests that are preventable are possible. Moreover, by making EWS a part of daily nursing work, the clinical decision-making process is solidified, more proactive care is encouraged than reactive one, and communication among disciplines is reinforced. Patient-centeredness is reflected in the synergy between standardized scoring systems and nurse-based interventions to ensure that the deteriorating patients are detected and addressed at an earlier stage rather than leaping to the critical stage (Liaw et al. 2024).



Cardiac arrest is one of the worldwide health issues that poses a significant problem to in-hospital mortality and morbidity. In spite of recent developments in the science of emergency medicine, most of the cases of cardiac arrest are preceded by a stage of detectable and progressive physiological deterioration that can be identified several hours before the event occurs. It has been shown that when this is identified and treated during the critical window the survival rates and long-term prognoses will be vastly improved. Nonetheless, it is still the case that failure to recognize early warning signs complicates healthcare delivery in most instances because of inadequacy in monitoring, communication, and clinical decision-making. In order to overcome these issues, healthcare systems across the globe have been using Early Warning Scores (EWS) which are structured evidence-based vital parameter monitors that encompass the heart rate, respiratory rate, blood pressure, oxygen saturation, and level of consciousness (van Rossum et al. 2023). These scores allow the standardised quantification of the patient risk, thus, early identification of developing clinical deterioration and issuing relevant interventions. EWS is a pivotal point between objective and subjective clinical assessments: it creates an opportunity to implement objective clinical parameters into the clinical decision-making process and notify about an emergency in an appropriate time frame. Nurses play a key part in the EWS implementation success. Being frontline caregivers, they involve themselves with the monitoring, recording and making of decisions about patient data. They are more accurate in their ability to pick up subtle changes in patient condition, in addition to the EWS, they add to identification of patients at risk of deterioration. In addition, nurse-mediated interventions (acceleration of care, deployment of fast response teams, and direct clinical care) play a key role in ensuring that worsening deterioration does not escalate to cardiac arrest. Nonetheless, there are issues when it comes to the integration of EWS and the role of nurses. Weak training, time lag in writing, work-related pressure, and mixed escalation procedures can reduce their effectiveness (Liaw et al. 2024). The realization of such challenges is critical to proper utilization of EWS and to be prepared to take an action by the nurses to prevent a poor performance. This paper discusses the correlation between Early Warning Scores and nurse interventions to prevent cardiac arrest with a focus on their operating efficiency, adverse problem issues, and a possibility of revolutionizing patient-safety at the hospital-level.

RATIONALE OF THE STUDY

Cardiac arrest refers to a life-threatening condition, which is frequently associated with the severe morbidity and mortality, provided that it is not addressed in time. It is consistently evidenced that most patients show physiological signs that precede the cardiac arrest by a few hours and yet they are either not observed or appropriately responded. The reason behind this disparity necessitates well-organized monitoring systems and clinical interventions on a timely basis so as to enhance patient outcomes. Standardisation of patient assessment of vital signs and other clinical parameters have become systematic procedures because the Early Warning Scores (EWS) have been used to identify the existence of patient deterioration at an earlier stage. By quantifying risk, and indicating the necessity of immediate examination, EWS serves as a crucial measure between observation and mitigation. Nevertheless, the efficiency of these systems largely remains to the role of nurses since they are the initial touch point involved in patient care that engage in continual monitoring, reportation and escalation of issues. Although the role of EWS and nurse-led interventions is well-regarded, their use continues to present obstacles to consistent and effective implementation. Little help is given by the delayed response, inadequate training, heavy workload and inconsistency in following escalation protocols thus restraining the potential role of such systems. This is the reason why cases of in-hospital cardiac arrest, which can be prevented, still happen, highlighting the importance of further investigating the ways of EWS and nursing practice optimization.



The motivation behind this study is the fact that it has potential of detailing the synergistic effect of EWS and nurse interventions in the prevention of cardiac arrest. By examining the content of these strategies, barriers, and best practice, such studies can contribute toward evidence-based strategies that will enhance patient safety and prevent avoidable mortality. In addition, the results can be useful to the other members of the hospital administration, policymakers, and nursing academia members to reinforce the training curriculum, redesign the escalation code path, and firmly incorporate the structured monitoring tools into the regular practice. The expediency of endeavoring to address the gap between early recognition of deterioration and timely clinical action lies in nurses and EWS positioned at the centre of the process. In that way, it will contribute towards the healthcare aim to increase survival rates, promote better quality of care and minimise the number of preventable cardiac arrest in hospitals. Although it seems to have great potential, effectiveness of EWS in practice is inconsistent across healthcare systems. Shortcomings, including inadequate training, shortage of staff, workload, poorly consistent documentation, and ignorance of escalation policies can hamper the desired effect of the system. Such barriers in other instances lead to a lag in the identification of the deterioration and a loss of opportunity to intervene early. Overcoming those limitations is vital to maximize the lifesaving potential of EWS and nursing interventions. The motivation of this research is the fact that avoidable cardiac arrests can be improved substantially by optimized tracking and empowered nursing-based interventions. By defying the barrier between early detection and a prompt response to the safety of patients, the study will support the role of nurses as the first line of patient safety defenders and propagate the idea of EWS in everyday clinical practice with a constant fashion. Not only will the results enrich the academic field but the results will be useful in developing evidence-based guidelines and training programs that would improve each healthcare team in its ability to save lives.

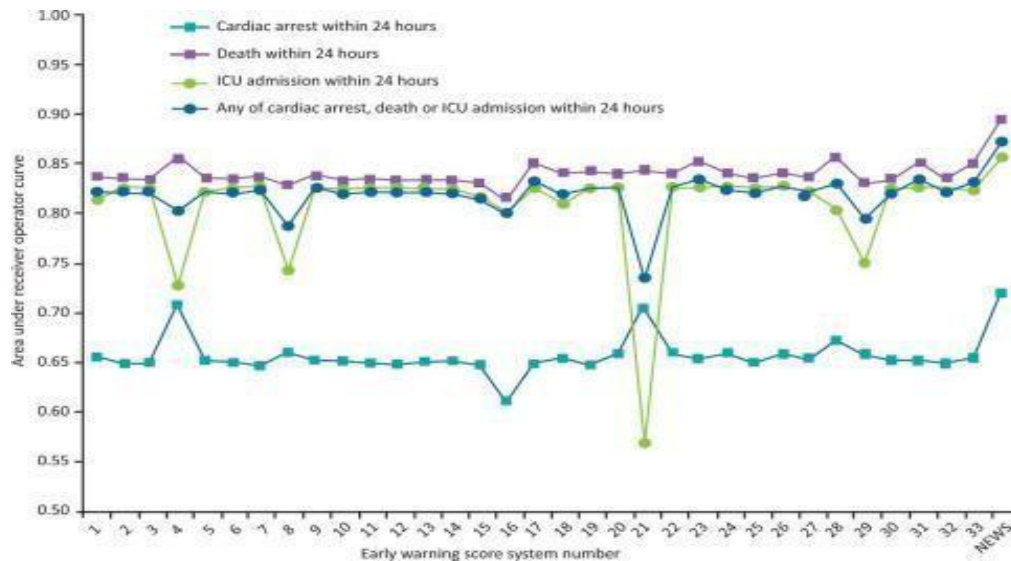
LITERATURE REVIEW

Early Warning Scores (EWS): Concept and Development

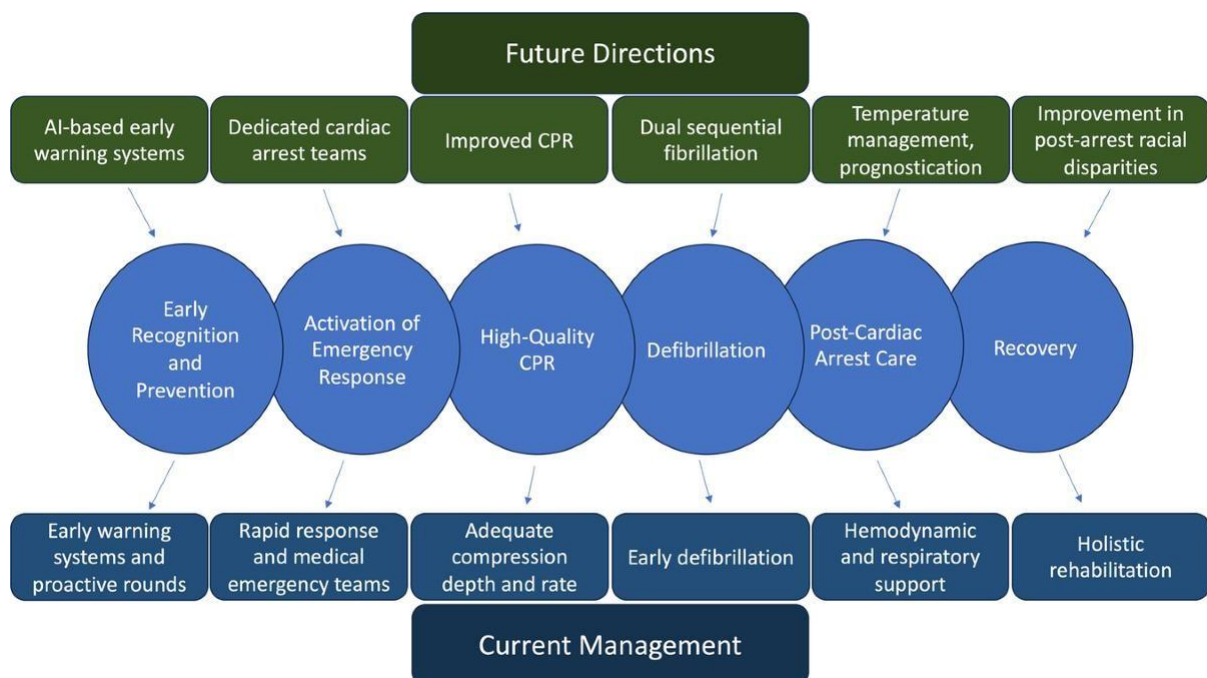
The idea of Early Warning Scores (EWS) came into the business line because most of the patients who experience cardiac arrest or other critical adverse events show evident signs of abnormal physiology hours prior to occurrence. Conventional patient monitoring depended upon a subjective approach with clinical judgment often being erratic and subject to time waste in detecting deterioration. To fill this gap, investigators and clinicians have formulated structured scoring systems in which measured vital signs are used as the objective measure of patient risk. The initial readily accepted instrument, the Modified Early Warning Score (MEWS) saw the light of day in the late 1990s in the United Kingdom. It involved straightforward parameters of physiological states like respiratory rate, heart rate, blood pressure, temperature, and level of awareness (Hsieh et al. 2024). The MEWS showed that deviations in these basic indicators when combined into a value could predict deterioration of the patient and indicated that the person was more often at risk of cardiac arrest, unplanned admission to ICU, or death.

This process of EWS development has been strengthened by loads of validation studies reporting that structured scoring systems are more useful than clinical judgment in identifying early indicators of the deterioration progress. In addition, EWS has also been crucial in unifying the communication between medical practitioners, so that a deteriorating patient is noted quickly and consistent course of action is taken. On the one hand, the design and implementation of EWS are evolving processes in spite of these advances. Active research aims at the refinement of predicting accuracy, electronic records incorporation and scoring

parameters assessment in special populations. The vision of EWS is getting closer to the reality of patient safety in the world, as it provided the basis of proactive patient safety and aimed at preventing cardiac arrest events and unfavourable clinical outcomes.



Based on MEWS, more advanced tools were created, to improve sensitivity and applicability. In 2012 the Royal College of Physicians launched the National Early Warning Score (NEWS) which introduced EWS to be standard across the United Kingdom and has since been updated to NEWS2. The parameters supplied by ENS/NEWS2 have been enlarged to comprise oxygen saturation, supplemental oxygen requirement, and further neurological decline based on the Glasgow Coma Scale (GCS). This modification enhanced predictive value of sepsis, acute respiratory failure and other life threatening diseases, and has since been considered as a bench mark tool of clinical deterioration monitoring. The main power of EWS is that it is incorporated into escalation plans. Most systems do not simply give a score, but are tied to structured clinical responses, including raising the frequency of monitoring, urgently reviewing with a physician or/and activating rapid response teams. This standardization decreases dependence on clinical judgment of specific clinicians, minimizes undue delays, and makes certain that we ensure that patients with deteriorating conditions are identified and characterized in an equally standardized manner. The usefulness of EWS has been confirmed in various studies throughout the world. Various studies consistently show that the higher EWS values are associated with unfavorable outcomes the mortality, unplanned ICU stay, and cardiac arrest. In addition, EWS has enhanced inter-disciplinary communication in the sense that, the scoring system offers common and objective lingo that can be shared among nurses, physicians, and the rapid response teams. The evolution of EWS is a paradigm shift in the hospital setting towards a proactive treatment. EWS, at the level of NEWS2 and its altered variations, has grown to be a stalwart of patient safety efforts (Hsieh et al. 2024). The usefulness of this tool, however, is relative as it is relevant to both the instrument itself and its application and action on its results, by frontline staff, especially nurses, to ensure that adverse events like cardiac arrest, do not occur.



Role of Nurses in Patient Monitoring and Early Intervention

Frontline workers such as nurses are in a unique position to identify the early signs of deterioration in patients and act on them as the earliest line of defense against preventing outcomes like cardiac arrest. Continuous bedside monitoring is a chiefly nursing task, and since they are also close to patients, nurses are in a unique position to recognise small shifts in physiology and behaviour that may foreshadow impending disasters. Assessments undertaken by the doctors, their vigilance, and the usage of systematic tools like Early Warning Scores (EWS) enable them to notice and escalate treatment in time. Although technological systems and EWS contain standardized suggestions, there is still a need to rely on the judgment of nurses. Nurses often observe the first point of worsening (Change in skin color, restless agitated or confusion, increased work-of-breathing) which often do not translate well on numerical scoring systems. This clinical intuition backed with assessment tools helps to improve accuracy and also ensures the changes that are of real importance are not ignored. It has been reported that aggressive approaches to monitoring and assuming critical thinking by nurses when applying the results of monitoring EWS is likely to be missed by a significant margin. The success of EWS is more likely based on early actions prompted by nurses. When a score exceeds a designated rank, it is the responsibility of the nurse to increase care based upon the response protocol of the hospital; this may include but is not limited to increasing the frequency of observation, notifying physicians, and deploying a rapid response team. Nurses, thus, find themselves in the role of gate keepers in clinical escalation pathway whereby they start to attend to the unstable patients in good time without overdoing it. The one-touch-go-touch response by nurses to situations is strongly correlated to the patient safety results (Van Velthoven et al. 2023).

Empirical evidence points to the fact that nurse-led interventions aimed at using EWS lead to the decreased cardiac arrests in hospitals, fewer unplanned intensive care unit admissions, and survival. The case in point is hospitals that have had the proper EWS protocol adopted and empowered the nursing staff, which report better patient outcomes as a result of early detection and engagement. In addition, since a standardized score provides interdisciplinary communication when communicating the deterioration, physicians are less likely to have misunderstandings and collaborate with nurses better. Proper use of EWS necessitates proper education, training and continuous training of nurses. The competency in measuring the vital signs accurately, computing scores, interpreting the scores and also initiating the corresponding response is of paramount importance. Studies suggest that well-guided programs of triage EWS training enhance compliance and proper utilization of the system in the hospitals. Moreover, by providing the nursing staff with the competence and courage to escalate care without any fear of hierarchy issues, one can optimize the effectiveness of EWS systems and improve the safety of patients in general.

In spite of their centrality, nurses have been found to experience difficulties in ensuring consistent use of EWS. Work overloads, inadequate staff, and chart/documentation tasks could lead to the delay of vital signs monitoring or the loss of escalation opportunities. Additionally, in certain healthcare cultures hierarchical relationships might not encourage a nurse to complain early, even when he/she sees a decline. Speaking about the ways to address these barriers, it is necessary to say that they are crucial in order to achieve the best possible potential of EWS and managing the transition of nurses when they are able to complete their duties successfully. Nurses undertake the role of facilitating the effective use of EWS, particularly the ability to translate risk scores into effective life-saving interventions. Their attentiveness, clinical training, and capacity to act rapidly place them in the epicentre of patient safety interventions that seek to preclude cardiac arrest. The long-term effectiveness will demand financial contributions towards training, sufficient rates of staffing and favourable organizational cultures whereby nurses are enabled to act without any delay.

Integration of Early Warning Scores in Clinical Practice

The incorporation of Early Warning Scores (EWS) into the daily practice of any unit of a hospital is a considerable step towards patient safety and the provision of care. The systems are not planned simply as surveillance mechanisms but also as organised systems that aid in early identification, risk loading and escalation. EWS tools like National Early Warning Score (NEWS/NEWS2) have spread rapidly since they were introduced in the late 2000s, especially in the United Kingdom, Europe, and now increasingly in Asia and in North America (Gallo et al. 2024). Their incorporation into national guidelines has contributed to uniformity in national procedures used to monitor the illnesses of acutely ill patients. Implementation would tend to involve the incorporation of EWS into standard vital check-ups, during which the nurses would measure and compute the scores at a specified time. Hospitals with a complete integration of EWS have indicated that they have experienced a sharp decline in their unanticipated ICU admissions, length of stay as well as their rates of in-hospital cardiac arrest.

National Early Warning Score (NEWS)*							
PHYSIOLOGICAL PARAMETERS	3	2	1	0	1	2	3
Respiration Rate	≤8		9 - 11	12 - 20		21 - 24	≥25
Oxygen Saturations	≤91	92 - 93	94 - 95	≥96			
Any Supplemental Oxygen		Yes		No			
Temperature	≤35.0		35.1 - 36.0	36.1 - 38.0	38.1 - 39.0	≥39.1	
Systolic BP	≤90	91 - 100	101 - 110	111 - 219			≥220
Heart Rate	≤40		41 - 50	51 - 90	91 - 110	111 - 130	≥131
Level of Consciousness				A			V, P, or U

*The NEWS initiative based from the Royal College of Physicians' NEWS Development and Implementation Group (NEWSDIG) report, and was jointly developed and funded in collaboration with the Royal College of Physicians, Royal College of Nursing, National Outreach Forum and NHS Training for Innovation.

The characteristics of EWS integration are the connection in a graded escalation protocols. Every score can be associated to a range of clinical actions, including improvement in the frequency of observations, calling a physician, or making a rapid response team (RRT) active. Clinical deterioration does not occur in a vacuum; it is through this structured escalation pathway that clinical deterioration is not only acknowledged but also that it is properly addressed in a timely and uniform practice. Research indicates that hospitals that have active escalation protocols according to EWS demonstrate quicker response times and better achievement than those that lack it. In the past few years, eEWS have been developed that are incorporated into EHR. eEWS automatically computes scores as vital signs are entered, lowering errors that often occur in manual score computation, and results in real-time alarms to healthcare personnel. eEWS also provides trend data that can show clinicians how patients are trending over the upper period of time. There is evidence to indicate that digital management enhances adherence in terms of following EWS protocols, better efficiency, and a shorter time in escalation. Nevertheless there still exist some hurdles to overcome that include the cost of systems, technical difficulties and the need to have the staff sufficiently trained to navigate digital platforms (Haegdorens et al. 2024). The ability to standardize communication between all the healthcare teams is one of the most crucial efforts of EWS integration. EWS can help nurses, physicians, and rapid response teams find a common vocabulary that presents complicated patient information in one score. This aids transmission of messages more clearly without any possibility of misunderstandings and the escalation of deterioration would be known. It has been demonstrated that interdisciplinary cooperation has improved, and hierarchies decreased time delay in the decision-making process using EWS.

The inclusion of EWS into practice does not come without difficulty. Factors that form barrier may include irregular belief and compliance to scoring standards, sub-standard personnel training, incompleteness in documentation, and opposition to innovation. As occurs in some instances, the tendency to trust EWS can result in implied inflated confidence in the system, where clinicians miss minor indicators of patient status that are not captured in the scoring system. Also, the efficiency of implementing EWS is differentiated by the availability of infrastructure in the high-resource and low-resource settings. The introduction of EWS in clinical practice has proven to be associated with significant positive changes in patient outcomes. Systematic reviews point at decreased rates of cardiac arrests, unintended ICU admissions and in-hospital deaths where EWS has been used in a consistent manner. Furthermore, by integrating EWS into everyday routine, hospitals develop a proactive culture of safety—where prevention is a priority, and early warning followed with prompt action. The introduction of Early Warning Scores into the clinical practice has changed the way the patient is monitored and how the deterioration management occurs. When rightly applied, i.e. when using powerful escalation protocols, digital aids, and in an interdisciplinary team, EWS becomes a keystone of the modern patient safety initiatives. But to be successful in the long-term, training should be continued, and compliance and the need to adapt to the particular clinical situations should be monitored.

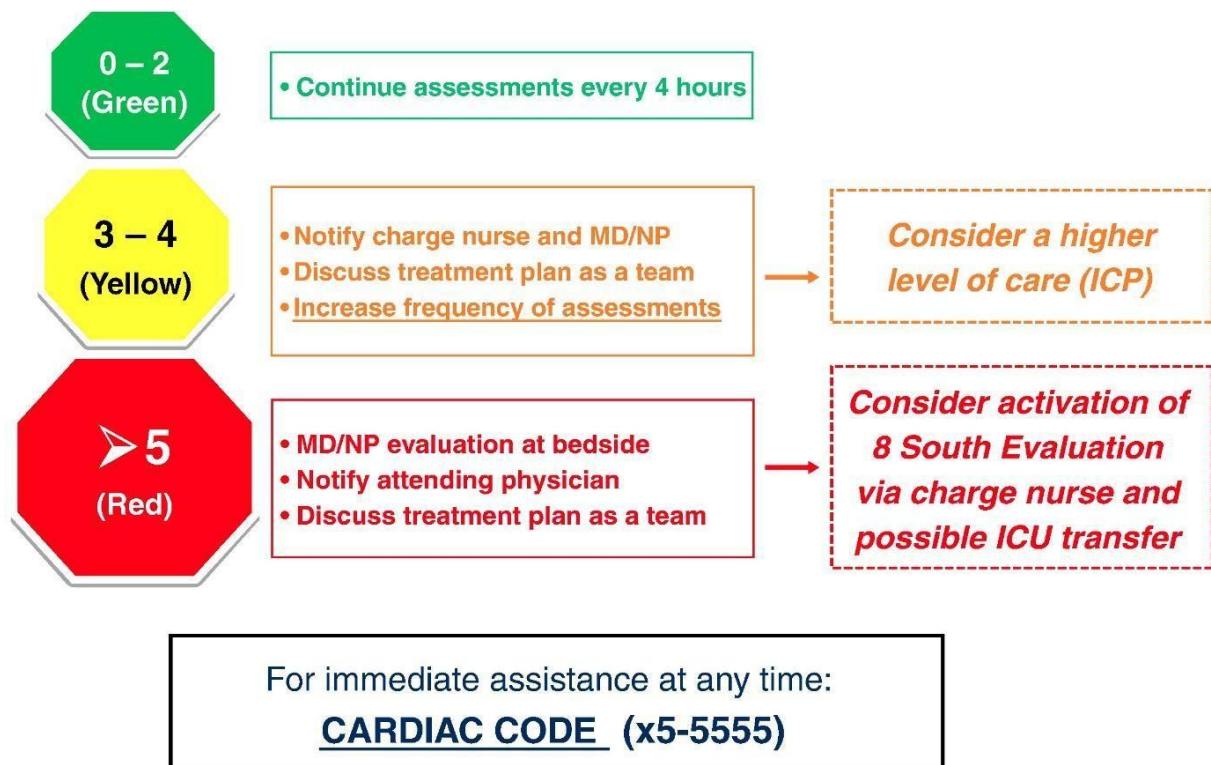
Barriers and Challenges in Utilizing EWS Effectively

Despite having been widely acknowledged as effective instruments of predicting patient deterioration, Early Warning Scores (EWS) do not transl into clinical practice without the hindrance of various obstacles. These difficulties are based on human, organizational and system related causes and they can play havoc with the effectiveness of EWS and the potential in not only avoiding negative events like cardiac arrest. The inconsistent follow-ups to EWS protocol are one of the most reported barriers (Levin et al. 2024). Nurses and other healthcare professionals can fail to measure vital signs as directed, improperly calculate scores, and/or postpone documentation. In high turnover units, it may be tempting to sacrifice routine EWS entries to those tasks that are judged to have a higher urgency. A lack of compliance pulls the system off course and slows the escalation of care to at-risk patients. High nursing workload and shortage of staff are major challenges in the path toward effective implementation of

EWS. Heavy workloads and high patient-to-nurse ratios and limited time and competing clinical demands have the potential to reduce the quality and frequency of patient observations. This raises the chances of not noticing the warning signs and incomplete escalation mechanisms. The need for systematic monitoring that is a hallmark of EWS is hard to maintain in many hospitals especially those of low-resource settings where exposure to limited staffing is high (Dresser et al. 2023).

The efficacy of the EWS rests on the skill of healthcare workers in the accurate measurement of vital signs, score calculation, score interpretation and response interventions. Even hundreds of trainings and lack of confidence in using EWS can lead to mistaken or not timely escalation. Studies indicated that not all nurses might take EWS as a clinical tool but instead consider it a new administrative burden with less enthusiasm. Training and refresher training sessions need to be carried regularly in order to guarantee competence and foster the idea of EWS as life-saving system and not a bureaucratic process. When deterioration is identified, there may be hierarchical obstacles to vertically escalating across healthcare settings. Nurses might be reluctant to confront medical personnel or other rapid response teams, especially in those institutions where traditional hierarchies do not support any demonstration of aggressive behavior (Williams et al. 2023). In these instances, warnings issued early might not be taken with prompt response, and this will lead to adverse events that could be avoided. The key to eliminating this barrier is to empower clinical nurses to raise concerns and escalate them with supremacy as there would be no fear of punishment. The other fear is the possibility of over dependence on the numeric scores at the expense of clinical judgment. EWS achieves some of this structure but may fail to induce high scores in deteriorating patients whose pathophysiology is not reflected within the thresholds of the system. In contrast, there is a possibility of false alarm which will cause alert fatigue among the staff. This conflict illustrates the importance of EWS to be balanced with professional opinion and of pointing out that even the most sophisticated scoring system cannot outperform the clinical judgment.

Approach to the Deteriorating Patient on Cardiac Inpatient Units: Escalation of Care: Cardiac - Children's Hospital Early Warning Score (C-CHEWS) Assessment Algorithm



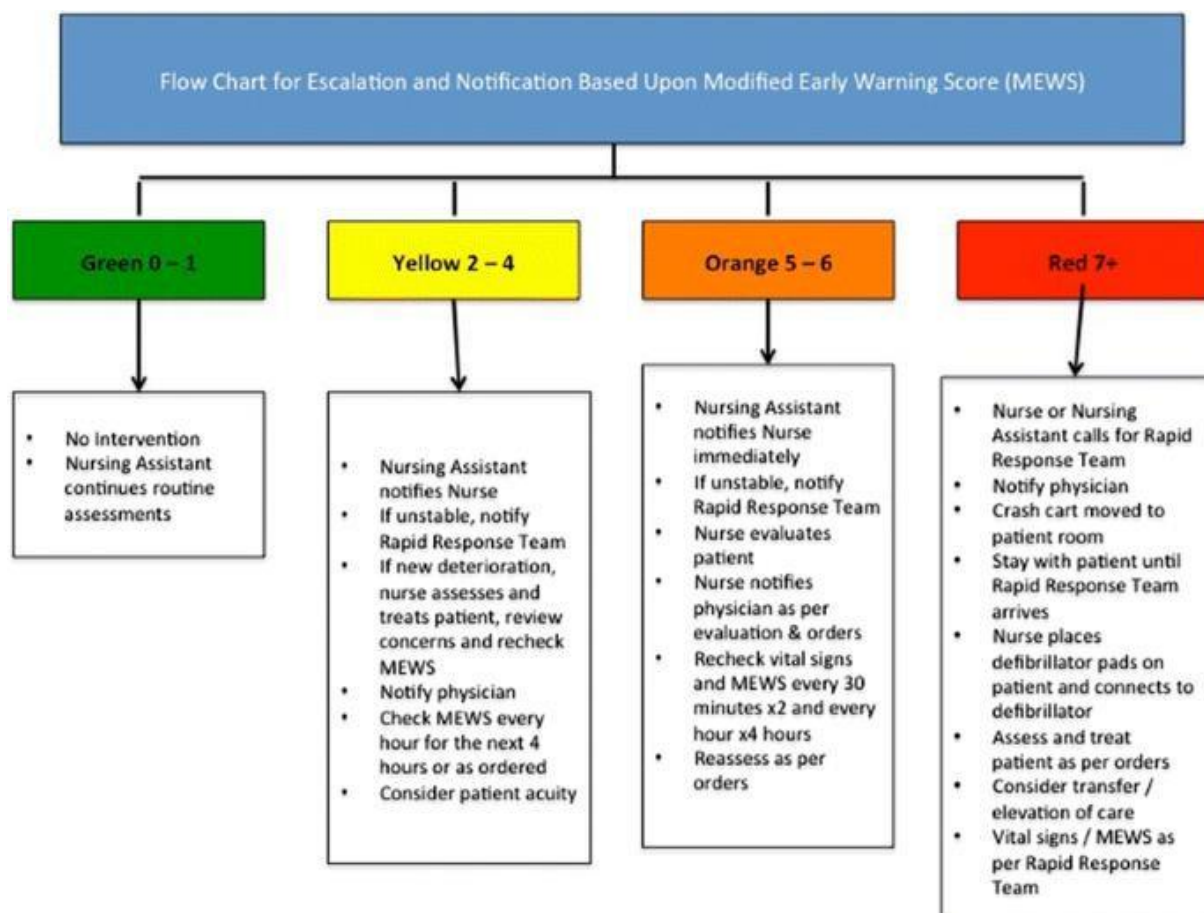
METHODOLOGY

This study employed a qualitative, literature based design to understand the efficacy of Early Warning Scores and nurse intercessions toward forestalling cardiac arrest. Selection criteria were that, the researches should be peer-reviewed, discuss the role of nurses in patient monitoring and how implementation of EWS in hospital settings affected patient outcomes such as mortality rates, unplanned ICU admissions, and the incidence of cardiac arrests. Research in high-resource and low-resource locations were included to give comparative insights. The exclusion criteria excluded papers that did not have any empirical evidence, those not written in English or only talked about development of the technological algorithms without implementing them clinically. Thematic analysis method was applied in synthesizing the findings obtained in the selected studies. The major themes identified were accuracy of EWS prediction, the contribution of nurses in early treatment, incorporation of EWS in clinical practice, obstacles to effective use and international practice realities. The methodology will guarantee the thorough insight into the overlaps between EWS and nursing procedures that ameliorate patient safety and preventable cardiac arrests.

RESULTS AND DISCUSSION

The literature review has shown conclusively that Early Warning Scores (EWS) can be effective in predicting such adverse events as patient deterioration, unplanned ICU admissions and in-hospital cardiac arrests. In cross-references, there is a common thread that the efficacy of these systems has been hinged on the efforts of nurses as they are the first users involved in monitoring vital signs, calculating scores, interpreting outcomes, and escalating care. Nurse-led interventions informed by EWS have been related to lower mortality rates, enhanced inter-disciplinary communication and a decrease in avoidable cardiac arrests. Use of EWS in clinical setting has also demonstrated improvement in safety outcomes of patients, especially in the hospitals with an effective escalation protocol being put in place and adhered to. Electronic Early Warning Systems (eEWS) have been developed further enhancing compliance and accuracy achieved through fully automating the calculation of the score and providing real-time alerts. Nevertheless, although there are many positive changes concerning EWS, there are still barriers that can negatively affect the way EWS is used in practice. Concerns relate to uniform adherence to protocols, high workloads, improper training, vertical delays and overreliance on numerical scores. Moreover, the failure to implement EWS integration equally proves to be very different in high-resource and low-resource healthcare facilities (Gallo et al. 2024).

Consolidating the literature, it is important to note that, although EWS has a sound clinical utility, its efficiency does not depend only on the tool itself but on functionality within healthcare systems and their support. Nurses have a vital role in this process in terms of both applying EWS and using clinical judgment that is complementary to structured scores. This means that their capacity to amplify alerts in a timely manner also relies on sufficient training, empowerment, and amiable institutional cultures (Van Velthoven et al. 2023). Simultaneously, the technological approach through eEWS has significant innovations but cannot substitute the potential quality check of a knowledgeable supervisor and adequate workforce levels. In conclusion, the evidence suggests that EWS is an effective method of mitigating preventable, cardiac arrests and reinforcing hospital safety cultures when adequately planned and implemented by an organization and proactively supported with nursing initiatives; however, failure to deal with both clinical and organizational obstacles is likely to not be an effective approach.



The evidence provided in this review suggests that Early Warning Scores (EWS) has been identified as an evidence-based and predictable method of clinical deterioration forecast and avoidance of in-hospital cardiac arrest. The scores based on the modified early warning score (MEWS), the national early warning score (NEWS/NEWS2) and adaptations of those scores applied to specific populations, e.g., the Pediatric early warning score (PEWS) and the obstetric early warning score (OEWS), have been proven to be successful at predicting adverse outcomes time after time (Hsieh et al. 2024). Their predictive ability resides in the fact that vital parameters are assessed systematically and this makes the process more objective and structured than the clinical observation. Those hospitals that have successfully implemented these systems into their monitoring procedures have all reported a reduction in unplanned ICU transfers, reduction in length of stay, and the most vital component, reduction in preventable cardiac arrest. The findings also underline the significance of nurses as the key members in a successful implementation of EWS

(Haegdorens et al. 2024). Nurses have both the responsibility of normal bedside monitoring and must also act as the lifeline between early identification of the patient at risk and appropriate escalation of care. Their awareness, the skill to identify subtle signs in the patient, and their professional judgment supplement standardized scoring system, which makes the process more efficient. Nurse-led interventions based on EWS are closely linked to patient safety outcomes and, therefore, show that action at the bedside level can change the course of patient care. Also, EWS offers nurses a uniform language to describe a deterioration to physicians and rapid response teams, resulting in fewer mistakes due to less ambiguity and more interdisciplinary cooperation.

Theme	Key Findings
Predictive Accuracy of EWS	Tools such as MEWS, NEWS/NEWS2, and PEWS reliably predict patient deterioration, unplanned ICU admissions, and cardiac arrest.
Role of Nurses	Nurses are central to EWS effectiveness: monitoring patients, calculating scores, escalating care, and improving interdisciplinary communication.
Integration into Clinical Practice	Hospitals with structured escalation protocols and use of eEWS show improved compliance, faster response times, and better patient outcomes.
Barriers to Effective Use	Challenges include inconsistent adherence, heavy workloads, staff shortages, inadequate training, and hierarchical barriers to escalation.
Impact on Patient Outcomes	Effective use of EWS reduces preventable cardiac arrests, lowers mortality rates, and shifts care from reactive to proactive models.

The review indicates some barriers and challenges that restrict the effectiveness of EWS despite such successes. Poor compliance to scoring protocols is a common problem, normally associated with high nursing workload, shortage of appropriate staff and other clinical pressurization. Poor training or being unable to use EWS due to, e.g., the lack of confidence might lead to inaccuracies in the calculation of scores or indecisiveness in notifying the escalation. Some healthcare settings have hierarchical structures that make it difficult to call out rapid response teams or members of the healthcare staff, a barrier that causes delays in care (Burke and Conway, 2023). Moreover, excessively using the numerical scores without taking clinical judgment into account may lead to the current being missed that might cause significant clinical deterioration in subtle ways. There are technological challenges too in that not all hospitals, especially in low-resource states, can independently afford or maintain electronic EWS platforms and it creates a disparity in outcomes.

These findings highlight the fact that EWS itself is not a miracle, but rather a tool that has to be used successfully within the organizational context of culture, empowerment of nurses, and institutional sponsoring. Although the evidence strongly indicates that EWS can decrease avoidable cardiac arrests, the full potential of the tool can be achieved only when a nurse is trained appositely, has support with adequate staffing, and is not restricted by his/her authority. The introduction of EWS to the hospital safety cultures should be consequential, therefore, embracing a combination of systematic tracking, interventions led by the nurses, digital tools, and efficient escalation paths. The overview shows that such a combination of Early Warning Scores and nurse-led interventions are one of the most effective measures to reduce the preventable in-hospital cardiac arrests (Williams et al. 2023). They can only be successful when dealing with practical barriers and generating favorable healthcare settings. Through adequate resource provision, reduced levels of hierarchy between different staff and a safety culture, hospitals could make the greatest use of EWS to protect life and the nurses become important nurturers of safety.

CONCLUSION

The results of this study underpin the importance of Early Warning Scores and interventions introduced by nurses in averting in-hospital cardiac arrest. EWS entails an evidence-based systematic way of recognizing early predictors of deterioration and its application is decisive in the hands of nurses who are the frontline caregivers and can have the first crack at it followed by the more serious stage of escalating care. The implementation of EWS in hospital practice with the help of systematic protocols, training, and electronic systems has become effective in the reduction of the cardiac arrests, which can be prevented and in general improve the outcomes of patients. The problem is that the potential of EWS is hampered by such issues as lack of consistency, personnel shortages, a lack of proper training and issues with hierarchy. The dialogue points out that a scoring system is not the only element that is necessary to implement it; organizational commitment, nurse empowerment, and the establishment of a culture where early recognition and intervention occur are the ones required. Additionally, the national and international disparities in high- and low-resource settings justify the need of cost-effective and flexible approaches to achieving equitable patient safety globally.

Early Warning Scores, supported by the proactive nursing interventions and supported by the institution, are a powerful tool in the move to shift the paradigm of patient safety with delivery that is now proactive rather than reactive. Additional research should be concentrated on enhancing nurse education, enhancing compliance planning, and incorporating advanced technology to further compliment early recognition programs, e.g., predictive analytics. With the funding placed on these areas, healthcare systems would save a lot of preventable cardiac arrest cases and guarantee timely life-saving interventions to target patients.

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