



Modified Early Warning Scoring System Improves Patient Safety and Clinical Outcomes at a Tertiary Care Multispecialty Hospital in India

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INTRODUCTION

Increase in the incidence of Code Blue, gave an alert to the Clinical and Nursing team. This led to brainstorming on the strategies which could be implemented in our wards. The Early Warning Scoring system, which was first reported by Morgan et al. in 1997, is a clinical assessment tool that scores systolic blood pressure, pulse, respiratory rate, and body temperature and if the patient is alert, responds to voice, responds to pain, or is unresponsive (AVPU). Studies have proved MET made a marked improvement in patient management, through rapid assessment of high-risk patients, timely decision-making in ward and care escalation. The MET on-call team has resulted in a 54% reduction in the number of cardiac arrest calls as found in a study. This tool was modified to suit our hospital policy and introduced in 2019. MET was formed and it comprised of an Intensivist and senior nurse from the adult Intensive care unit. This team would be summoned according to the escalation protocol defined in the EWS system.

AIM

- Aim**
Modified Early warning scoring system to improve Patient safety and clinical Outcomes at a Tertiary Care Multispecialty Hospital in India.
- Objectives**
 - To compare the code blue calls before and after implementing the Early Warning Scoring system
 - To compare Code Blue and MET calls after implementing the Early Warning Scoring system
 - To compare the code blue death rate and survival rate before and after implementing the Early Warning Scoring system
 - To assess the impact of EWS system on patients getting stabilized in ward and transferring to ICU

METHOD

Design- Descriptive study design
Setting: The study was carried out in the wards of Mehta Multi Specialty Hospitals, Chennai, India, a 200-bedded health care facility.
Sample size -292 samples, All patients for whom MET call was activated.
Sampling Technique – Enumerative sampling technique
Study period- 2019 to 2023.
Ethical consideration: Ethical review board approval was taken before implementation of early warning scoring system
Data collection tool: Quality Indicator tracking excel sheet and Code Blue form were the tools used for data collection. Apart from these tools, patients’ health record was also a source of data.
Data Collection Procedure
Pre-Intervention data such as Number of Adult code Blues, the survival rate, stabilization rates were studied from 2016 to 2018. The Importance of Early Warning Score (EWS) implementation was put forth in the Mortality Committee meeting by the Nursing Directorate. After the ethical review board Approval, EWS system was implemented in 2019. All the Bed side Nurses, Incharges and Nursing Supervisors were trained in Assessing Early Warning Scores, its interpretation and escalation protocol. The bedside Nurses were asked to document the EWS in Vital signs chart. The frequency of assessment and reassessment was based on the EWS, SOP. The Number of MET calls, Code Blues, Survival rates, Death percentage were analysed after Implementation of Modified Early Warning score. The data were Tracked using Quality Indicator tracking excel sheet, Code Blue Medical Emergency form, Team Documentation form and the patient health record. The following outcome parameters have been included in the Quality Indicator such as MET calls, Code Blues and Outcome of MET calls since 2019. All the Collected data were tabulated and analysed for Interpretation.

RESULTS

Modified Early Warning Scores for Adult							
Parameters	3	2	1	0	1	2	3
Conscious level				Normal Sensorium	Responds only to verbal commands	Responds only to painful stimuli	Unresponsive
Heart Rate		<40	41-50	51-100	101-110	111-130	>130
Blood Pressure (Systolic, mm of Hg)	<70	71-80	81-100	101-179	180-199	200-220	>220
Respiratory Rate		<8	8 to 11	12 to 20	21 to 25	26- to 30	>30
SPO2	<85%	86-89%	90-94%	>95%			
Total Score							

Standard Operating Procedure	
Score 0	Continue the assessment 4th hourly
Combined Score 1-3	The charge nurse and DMO attend to the patient and take support from the primary consultant when required
A single score of 3 OR combined score of >= 4 OR Patient unresponsive	Activate MET call (1111)

Before Implementing Early Warning Score				After Implementing Early Warning Score					
Parameters observed	2016	2017	2018	Parameters observed	2019	2020	2021	2022	2023
Ward Code Blue Incidence	31	38	29	Ward Code Blues Incidents	22	18	14	12	10
Ward Code Blue per 1000 patient days	0.89	1.02	0.81	Ward Code Blue per 1000 patient days	0.55	0.63	0.38	0.38	0.25
% of code Blue patients shifted to ICU	83.87	68.42	86.20	MET calls	41	28	46	42	59
Incidence of Death in code Blue calls	5	12	4	MET calls per 1000 patient days	1.04	0.98	1.27	1.15	1.48
Code Blue Death Percentage	16.12	31.57	13.79	% of MET call patients stabilized in the ward	24.4	75	78.3	85.7	98.3
Code Blue Survival Percentage	83.87	68.42	86.20	% of MET call patients transferred to ICU	75.60	25	21.7	14.3	1.7
				Death Percentage	0	0	0	0	0
				Survival Percentage	100	100	100	100	100

Table 1: Study of Code Blues Before Introducing early warning scores This table shows the code Blue incidences in the wards before introducing Early warning scoring system in the 3 adult wards. The average incidence of code Blues from 2016 to 2018 was 33. The average percentage of code Blue patients transferred to ICU and survived was 79.4% and the death percentage was 20.4%.

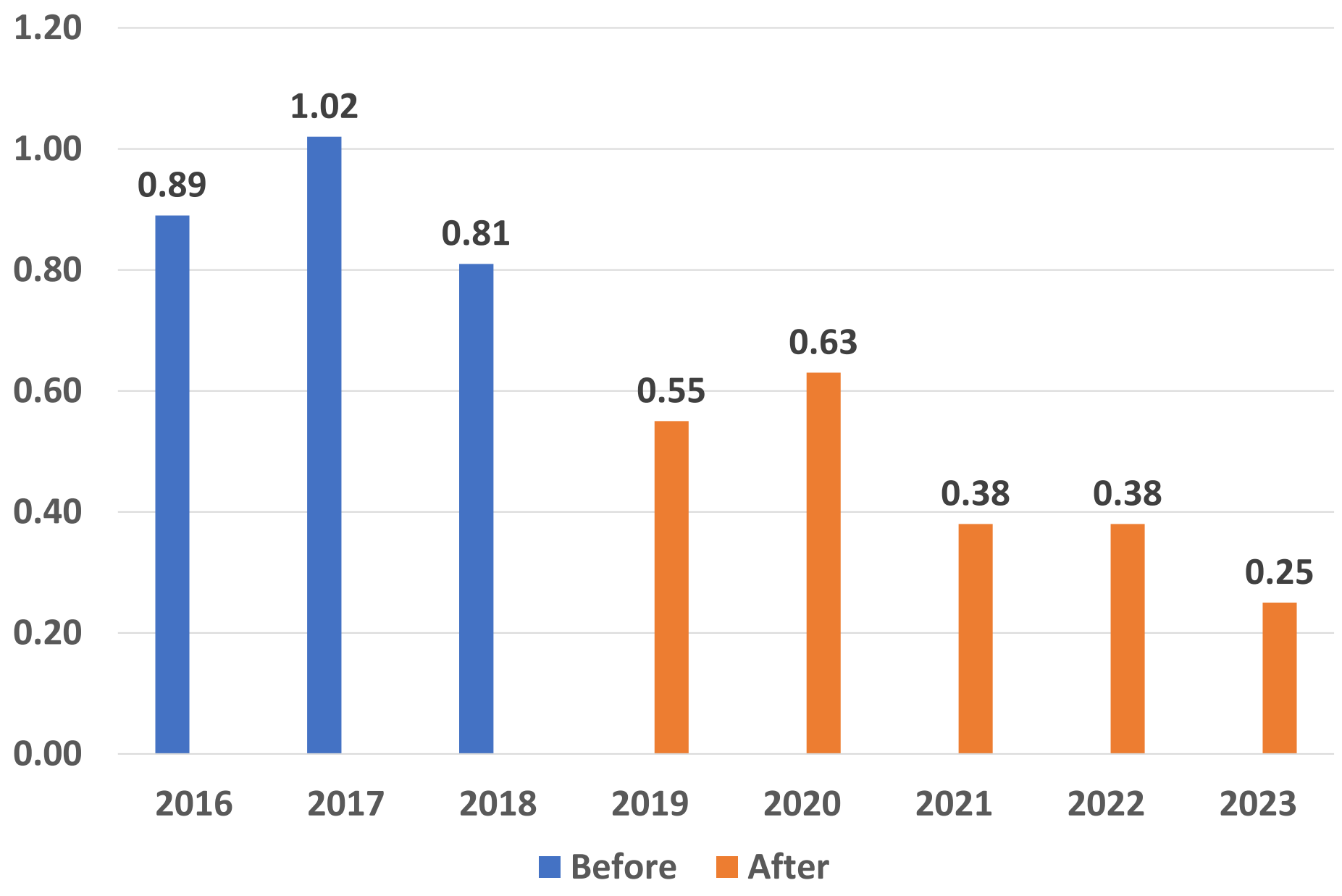


Figure 1: Comparing Incidence of code Blues before and after Introducing the Early Warning Scoring system per 1000 patient. We find that code blues calls steadily decreasing year on year after introducing EWS and MET call.

Table 2: Study of Code Blues after Introducing Early Warning Scoring System. This table shows the code Blue incidences and MET calls in the wards after introducing Early warning scoring system in the 3 adult wards. The incidence of MET calls and code Blues from 2019 to 2023 was 43 and 15 respectively. Average Percentage of MET call patients stabilized in ward and transferred to ICU was 69.4% and 27.6% respectively. Here again the observation is there was a gradual decrease of code Blue calls and Increase of MET calls year on year. It was also observed that the survival percentage of patients who had MET call was 100%.

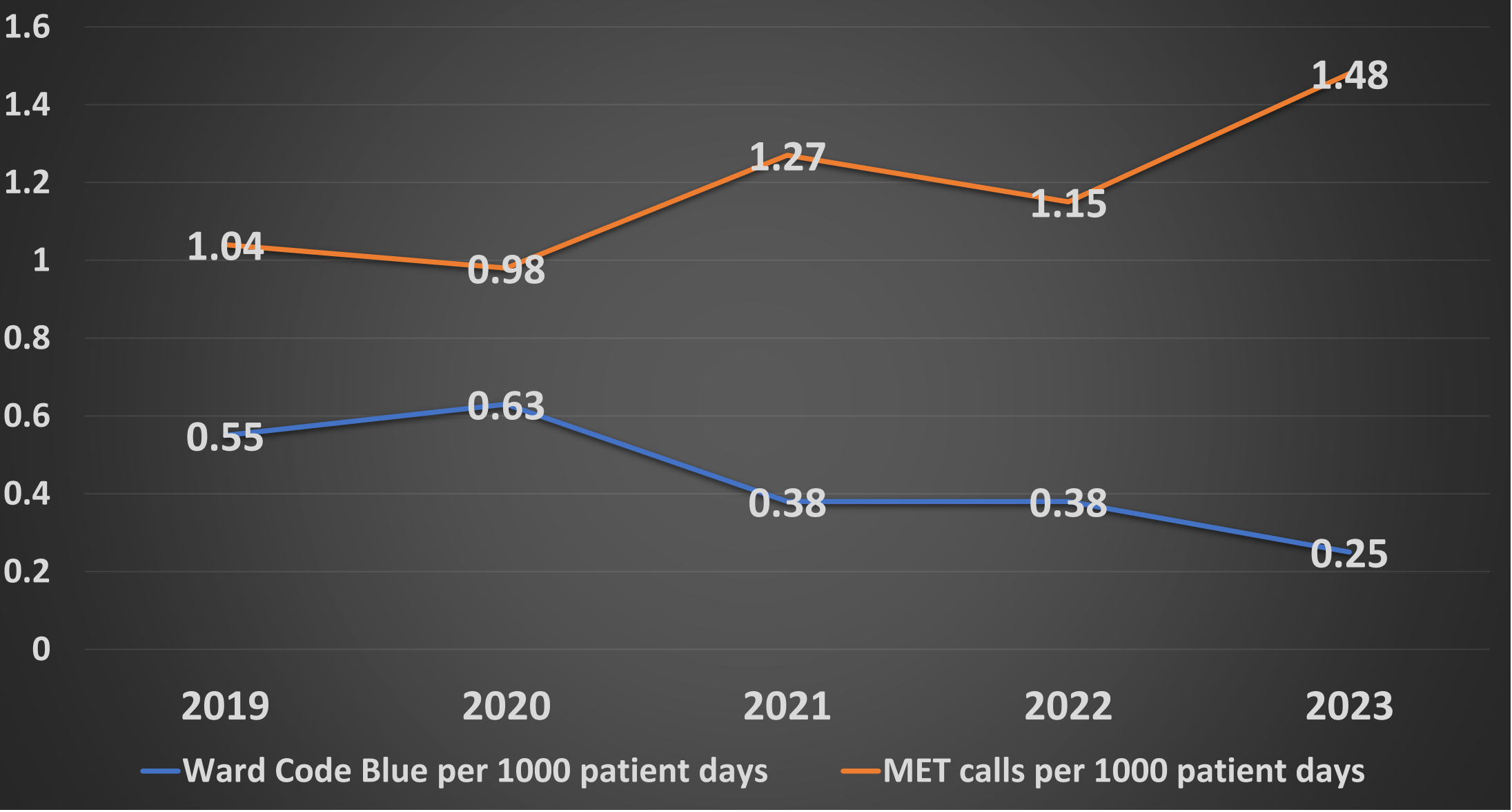


Figure 2: - Comparing Incidence of Code Blue and MET calls after implementing the Early Warning Scoring system. We see MET calls steadily increasing and code blue calls steadily decreasing year on year

CONCLUSIONS

When the early warning scoring system was introduced, the Nursing team needed intense training and supervision and close handholding. The observer trained the entire nurse leadership team and they in turn trained their bedside nurses to strengthen this initiative. Until this became a regular practice, supervision and repeated training were required.
Clinical implication: The escalation protocol served as a clinical decision support for the bedside nurses, Incharges, and DMOs. Introducing EWS system has empowered the nursing team to sort clinical help from the MET team to stabilize patient early before severe deterioration thus increasing the consultant, patient and nurses’ satisfaction. EWS has proved to a powerful tool in identifying patient deteriorations early and improve the safety and quality of patient care by summoning MET. It has reduced code blues, mortality, ICU transfers and increased survival rate among patients who had code blue calls. This initiative helped us in picking up the alarming signs at the right time and save the Pateint.

ACKNOWLEDGEMENT

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- Thanks to our entire Nursing team for joining hands with us in successful implementation and driving the MET call thus ensuring patient safety and successful clinical outcomes

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