International Journal of Science Academic Research
Vol. 06, Issue 03, pp.9482-9487, March, 2025
Available online at http://www.scienceijsar.com

ISSN: 2582-6425

Research Article

A STUDY TO ASSESS THE EFFECTIVENESS OF NURSE-LED PRE-MEDICAL EMERGENCY TEAM RESPONSE ON REDUCTION OF MEDICAL EMERGENCIES AT SELECTED HOSPITALS

[1,] *Hema Malini, S., [2]Anantha Lakshmi, N., [3]Bhuvaneshwari, C. and [4]Thulasi, L.

[1]Clinical Nurse Lead - Specialist, Apollo Speciality Hospitals, OMR, Chennai, Tamil Nadu, India
[2]Assistant Nursing Superintendent, Apollo Speciality Hospitals, OMR, Chennai, Tamil Nadu, India
[3]Assistant Clinical Nurse, Apollo Speciality Hospitals, OMR, Chennai, Tamil Nadu, India
[4]Clinical Nurse Lead - Specialist, Apollo Speciality Hospitals, Vanagaram, Tamil Nadu, India

Received 19th January 2025; **Accepted** 24th February 2025; **Published online** 14th March 2025

Abstract

The Pre-Medical Emergency Team (Pre-MET) tier of rapid response systems facilitates early recognition and treatment of deteriorating ward patients using MEWS chart and Pre-MET Forms before a MET review is needed. Recognizing and responding to clinical deterioration is a core nursing responsibility. Pre-MET / RRT (Rapid Response Team) member will responds quickly to deliver critical care expertise in response to grave clinical deterioration of patient located outside a critical care unit. Modified Early Warning Scoring System (MEWS) which can encourage early intervention, timely transfer to a higher level of care and prevention of Code blue activation. The objectives of this study are to assess the Effectiveness of Pre-MET forms and team response on reduction of Medical Emergencies. The Research approach was Quantitative, Quasi-experimental design - One group pre-test and post-test was used for this study. Pre-MET nurse & Charge Nurses will have follow up of Patients based on their MEWS Chart criteria and will track in Pre-MET Forms and inform the MET Team before activation of MET Calls. Data were collected and analyzed. It reveals that, Overall pre MET is 73.68% and MET is 26.32% in 3rd floor A & B Wards. Overall pre MET is 80.77% and MET is 19.23% in General Ward. Overall pre MET is 76.47% and MET is 23.53% in 1st Floor ward, General ward & 3rd Floor ward – 2024. Overall Mean percentage level of Pre MET & MET in wards is pre MET is 76.06% and MET is 23.94% in 1st Floor ward, General ward & 3rd Floor ward – 2024. So, the Nurse led Pre-Medical Emergency team response has been reduced the Medical Emergencies in wards at selected hospitals.

Keywords:

INTRODUCTION

The Pre-Medical Emergency Team (Pre-MET) tier of rapid response systems facilitates early recognition and treatment of deteriorating ward patients using MEWS chart and Pre-MET Forms before a MET review is needed. Recognizing and responding to clinical deterioration is a core nursing responsibility. Pre-MET / RRT (Rapid Response Team) member will responds quickly to deliver critical care expertise in response to grave clinical deterioration of patient located outside a critical care unit. Modified Early Warning Scoring System (MEWS) which can encourage early intervention, timely transfer to a higher level of care and prevention of Code blue activation.

- Implementing "MEWS adds another layer of early detection to the Pre-MET/RRT system" and allows the healthcare team to intervene earlier
- Incorporated a new tracking (MEWS – Modified Early Warning Scoring System) chart with severity score to assess the condition and improve early identification of deterioration in patients
- Nurse enter vital signs on a chart form that has red-shaded zones to identify findings outside the normal range for six vital signs, namely: Respiratory rate, heart rate, systolic blood pressure, level of consciousness, temperature, pain and hourly urinary output.
- When any one of these signs falls into a red zone, the nurse determines a MEWS score for the patient, assigning a number between 0-3 to each of the six vital signs.
- The nurse then adds the individual scores for a total MEWS score. If the total score is 4 or higher, the nurse is to call the patient's provider and alert the Pre-MET/RRT.

Corresponding Author:** ***Hema Malini, S.,
Clinical Nurse Lead - Specialist, Apollo Speciality Hospitals, OMR, Chennai, Tamil Nadu, India

Objectives of the study

To assess the Effectiveness of Pre-MET forms and team response on reduction of Medical Emergencies.

Assumptions: Pre-MET forms and their responses will reduce the Activation of Medical Emergencies.

METHODOLOGY

Research approach: Quantitative approach

Research design: Quasi-Experimental design – One group Pre-test & Post-test design

The variables used

- Research Variable: Pre-MET Response/Pre-MET Form
- Dependent Variable: Reduction of Medical Emergencies / Reduction of MET Calls

Settings of the study: Wards in Apollo Speciality Hospitals, OMR

Duration of the study: 6 Months

Data collection method:

- Pre-MET nurse & Charge Nurses will have follow up of Patients based on their MEWS Chart criteria and will track in Pre-MET Forms and inform the MET Team before activation of MET Calls.
- **Target population:** Pre-MET patients in Wards
- **Sample Size:** 70-80 Pre-MET Patients, 20-30 MET Patients. Total 110 – 120 Patients
- **Sampling Method:** Non-Probability Purposive sampling technique

Inclusion criteria:

Patients MEWS Score ≥ 2

Exclusion criteria:

Patients MEWS Score ≤ 1

Ethical considerations: Ethical clearance received from Institutional Ethics Committee – Bio Medical Research, Apollo Hospitals, and Chennai on 16th December 2024. IEC-BMR Application No – AOH-C-S-005/12-24.

TOOL USED FOR DATA COLLECTION

Section A

- Demographic Variables like Age, Sex, Education, Occupation, Marital status, Type of family, Co-morbidities, Vital signs.

Section B

- MEWS Chart to assess the Pre-MET Criteria. Pre-MET forms to follow and shift the patient to ICU without activating MET Calls

RESULTS

Table 1. Age Distribution

(N = 117)

Age distribution	Pretest				Chi-square value	P value
	PreMET Group (n=89)		MET Group (n=28)			
	No.	%	No.	%		
<40 years	8	8.99%	8	28.57%		0.05*
41-60 years	20	22.47%	4	14.29%	7.08	(S)
> 60 years	61	68.54%	16	57.14%		DF=2
TOTAL	89	100.00%	28	100.00%		

Fig1 DF= Degrees of freedom S= significant NS= not significant P≤0.05 significant

Table1 compares the level of age distribution between Pre MET and MET group of patients. Percentage of < 40 years are more in met group than unmet group.

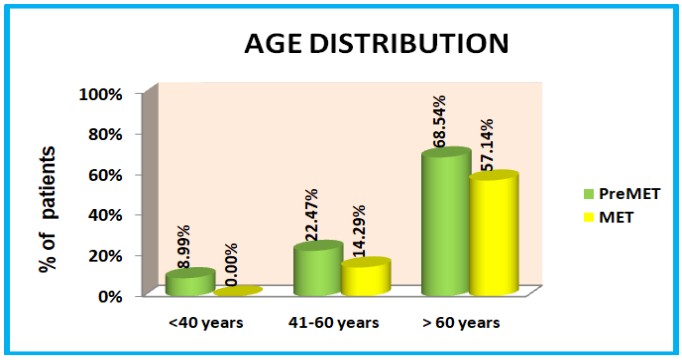

Fig. 1. simple bar Diagram compares the age distribution between Pre MET and MET patients

Table 2. Sex distribution

(N = 117)

Sex distribution	Pretest				Chi-square value	P value
	PreMET Group (n=89)		MET Group (n=28)			
	No.	%	No.	%		
Male	46	51.69%	18	64.29%	1.35	0.25
Female	43	48.31%	10	35.71%		(NS)DF=1
Total	89	100.00%	28	100.00%		

Fig2 DF= Degrees of freedom S= significant NS= not significant P>0.05 significant

Table2 compares the level of sex distribution between Pre-MET and MET group of patients. Sex wise there is no significant difference between Pre-MET and MET group.

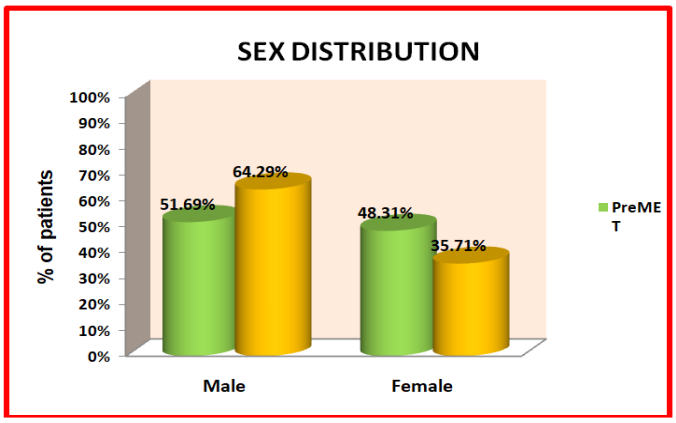

Fig. 2. simple bar Diagram compares the sex distribution between PreMET and MET patients

Table 3. Education status

(N = 117)

Education status	Group				Chi-square value	P value
	PreMET Group (n=89)		MET Group (n=28)			
	No.	%	No.	%		
Graduate	38	42.70%	13	46.43%		0.33
Primary	23	25.84%	10	35.71%	2.20	(NS)
Secondary	28	31.46%	5	17.86%		DF=2
Total	89	100.00%	28	100.00%		

Fig3DF= Degrees of freedom S= significant NS= not significant P≤0.05 significant

Table 3 compares the level of education status between Pre MET and MET group of patients. Education status there is no significant difference between Pre-MET and MET group.

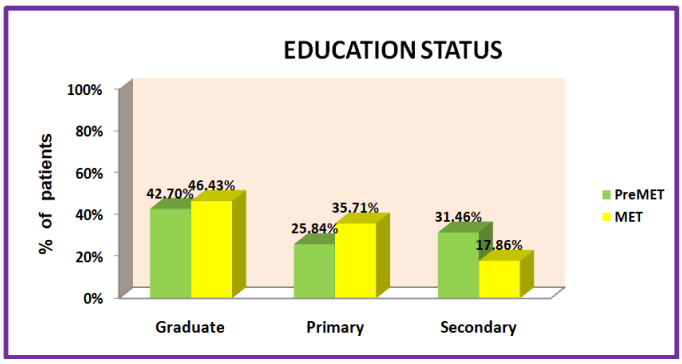

Fig. 3. simple bar Diagram compares the Education status between Pre MET and MET patients

Table 4. Occupation status

(N = 117)

Education status	Group				Chi-square value	P value
	PreMET Group (n=89)		MET Group (n=28)			
	No.	%	No.	%		
Business	17	19.10%	4	14.29%		
House Wife	24	26.97%	11	39.29%		
Private company	16	17.98%	7	25.00%	6.14	0.19 (NS) DF=4
Retired	30	33.71%	4	14.29%		
Student	2	2.25%	2	7.14%		
Total	89	100.00%	28	100.00%		

Fig4 DF= Degrees of freedom S= significant NS= not significant P≤0.05 significant

Table 4 compares the level of occupation status between Pre MET and MET group of patients. Occupation status there is no significant difference between unmet and met group.

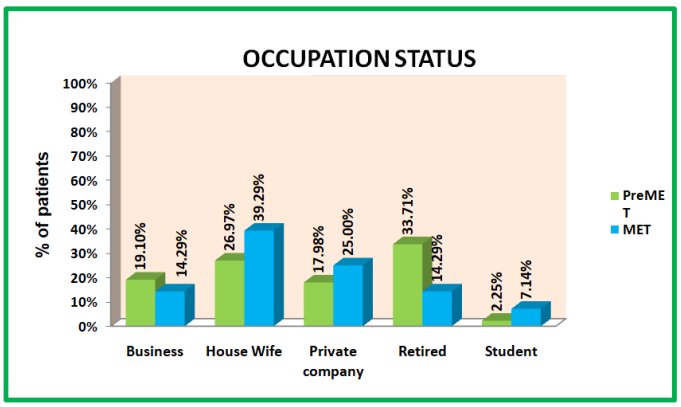

Fig. 4. Simple bar Diagram compares the occupation status between Pre MET and MET patients

Table 5. Marital status

(N = 117)

Marital status	Group				Chi-square value	P value
	PreMET Group (n=89)		MET Group (n=28)			
	No.	%	No.	%		
Married	85	95.51%	24	85.71%		
Unmarried	3	3.37%	4	14.29%	4.774	0.09 (NS) DF=2
Widow	1	1.12%	0	0.00%		
Total	89	100.00%	28	100.00%		

Fig5 DF= Degrees of freedom S= significant NS= not significant P>0.05 not significant

Table 5 compares the level of marital status between Pre MET and MET group of patients. Marital status there is no significant difference between Pre-MET and MET group.

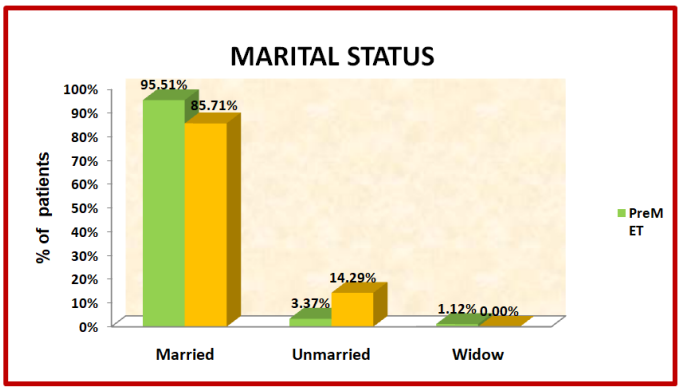

Fig. 5. Simple bar Diagram compares the marital status between Pre MET and MET patients

Table 6. Type of family

(N = 117)

Type of family	Group				Chi-square value	P value
	PreMET Group (n=89)		MET Group (n=28)			
	No.	%	No.	%		
Joint family	35	39.33%	11	39.29%	0.01	0.99 (NS) DF=1
Nuclear	54	60.67%	17	60.71%		
Total	89	100.00%	28	100.00%		

Fig 6 DF= Degrees of freedom S= significant NS= not significant P>0.05 not significant

Table 6 compares the level of type of family status between Pre MET and MET group of patients. Type of family status there is no significant difference between Pre-MET and MET group.

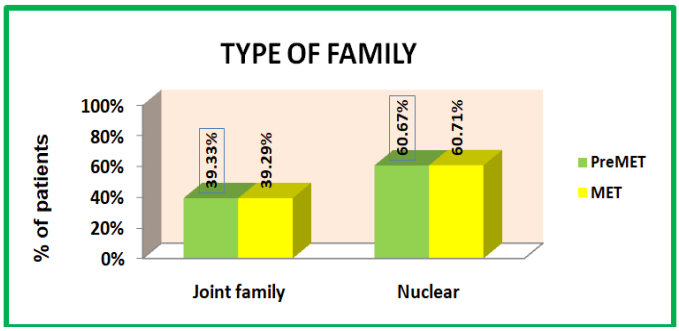

Fig. 6. Simple bar Diagram compares the Type of family between Pre MET and MET patients

Table 7. Incidence of Pre MET and MET (3rd floor A & B Wards)

3rd floor A & B Wards							
Month	Jul'24	Aug'24	Sep'24	Oct'24	Nov'24	Dec'24	Total
Pre MET	10	8	11	6	3	4	42
MET	2	3	5	3	1	1	15
Total	12	11	16	9	4	5	57

$\chi 2$=1.11 p=0.95 not significant

Month wise Incidence wise there is no significant difference But pre MET is more than MET

Pre MET	42	73.68%
MET	15	26.32%

Overall pre MET is 73.68% and MET is 26.32% in 3rd floor A & B Wards

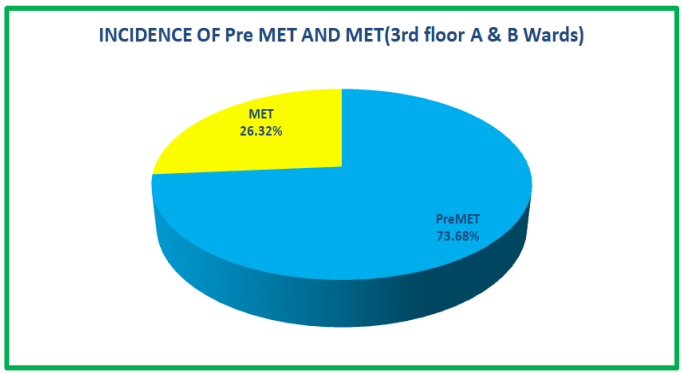

Fig. 7. Pie Diagram shows the incidence of Pre MET and MET patients in the3rd floor A & B Wards

Table 8. Incidence of Pre MET and MET (General Ward)

General Ward							
Month	Jul'24	Aug'24	Sep'24	Oct'24	Nov'24	Dec'24	Total
Pre MET	2	3	3	6	3	4	21
MET	1	0	1	0	1	2	5
Total	3	3	4	6	4	6	26

$\chi 2=3.42$ p=0.65 not significant

Month wise Incidence wise there is no significant difference But pre MET is more than MET

Pre MET	21	80.77%
MET	5	19.23%

Overall pre MET is 80.77% and MET is 19.23% in General Ward

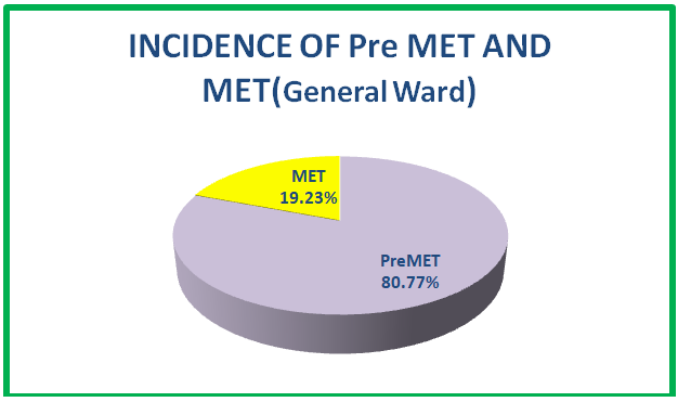

Fig. 8. Pie Diagram shows the incidence of Pre MET and MET patients in the General Wards

Table 9. Incidence of Pre MET and MET (1st Floor ward)

1st floor							
Month	Jul'24	Aug'24	Sep'24	Oct'24	Nov'24	Dec'24	Total
Pre MET	12	6	3	1	3	1	26
MET	4	2	1	0	1	0	8
Total	16	8	4	1	4	1	34

$\chi 2=0.65$ p=0.99 not significant

Month wise Incidence wise there is no significant difference But pre MET is more than MET

Pre MET	26	76.47%
MET	8	23.53%

Overall pre MET is 76.47% and MET is 23.53% in 1st Floor ward, General ward & 3rd Floor ward - 2024

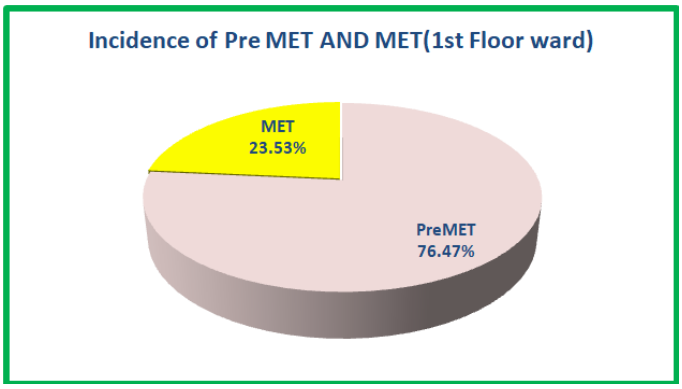

Fig. 9. Pie Diagram shows the incidence of Pre MET and MET patients in the1st Floor ward

Table 11. Incidence of Pre MET and MET (1st Floor ward, General ward & 3rd Floor ward - 2024)

1st Floor ward, General ward & 3rd Floor ward - 2024							
Month	Jul'24	Aug'24	Sep'24	Oct'24	Nov'24	Dec'24	Total
Pre MET	24	17	17	13	9	9	89
MET	7	5	7	3	3	3	28
Total	31	22	24	16	12	12	117

$\chi 2=2.28$ p=0.80 NS

Month wise Incidence wise there is no significant difference But pre MET is more than MET

Pre MET	89	76.06%
MET	28	23.94%

Overall pre MET is 76.06% and MET is 23.94% in 1st Floor ward, General ward & 3rd Floor ward - 2024

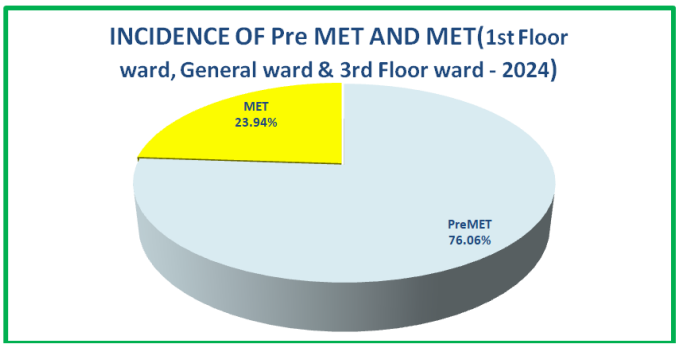

Fig. 10. Pie Diagram shows the incidence of Pre MET and MET patients in the 1st Floor ward, General ward & 3rd Floor ward – 2024

Overall pre MET is 73.68% and MET is 26.32% in 3rd floor A & B Wards. Overall pre MET is 80.77% and MET is 19.23% in General Ward. Overall pre MET is 76.47% and MET is 23.53% in 1st Floor ward, General ward & 3rd Floor ward – 2024. Overall Mean percentage level of Pre MET & MET in wards is pre MET is 76.06% and MET is 23.94% in 1st Floor ward, General ward & 3rd Floor ward – 2024.

DISCUSSION

The Present study results revealed Overall pre MET is 73.68% and MET is 26.32% in 3rd floor A & B Wards. Overall pre MET is 80.77% and MET is 19.23% in General Ward. Overall pre MET is 76.47% and MET is 23.53% in 1st Floor ward, General ward & 3rd Floor ward – 2024. Overall Mean

percentage level of Pre MET & MET in wards is pre MET is 76.06% and MET is 23.94% in 1st Floor ward, General ward & 3rd Floor ward – 2024. So, the Nurse led Pre-Medical Emergency team response has been reduced the Medical Emergencies in wards at selected hospitals. The study which supports the result of the current study done by Kiley Nelson *et al.,* (2024) on Nurse-led medical emergency response reduces code blue team activations in non-hospitalized patients. This study describe the creation of a two-tier emergency response system with a nurse-led first responder program titled "MET-RN" (Medical Emergency Team-Registered Nurse) created for ambulatory settings supported by a critical care code blue team for escalation in medical emergency. This observational study evaluated the clinical characteristics and effects of a MET-RN program on the code blue response. The study findings are MET-RN responded to 6564 encounters from January 2016 to June 2021. The most frequent trigger call was dizziness/light headedness, with a prevalence of 12.0%. 33.9% of the patients seen by MET-RN were transported to the ED for further evaluation. Establishing a MET-RN system led to an estimated median of 58.3% reduction in utilization of the code blue team per quarter. A two-tiered response system resulted in an improved allocation of hospital resources and kept critical care teams in high-acuity areas while maintaining patient safety. The creation of MET-RN first responder system enabled the ambulatory areas to receive minor, urgent and emergent patient care support, leading to a decrease in utilization of the code blue team for the hospital. The study which supports the result of the current study done by Daryl Jones et.al, November 2023, a study was conducted to Breaches of Pre-medical emergency team call criteria in an Australian hospital; Critical care resuscitation. The finding of the study reveals that Breaches in pre-MET criteria occurred prior to 1886/2255 (83.6%) MET calls, and 1038/1281 (81.0%) of the first MET calls. Patients with pre-MET breaches were older (median [IQR] 72 [57-81] vs 66 [56-77] yrs), more likely to be admitted from home (87.8% vs 81.9%) and via the emergency department (73.0% vs 50.2%), but less likely to be for full resuscitation after (67.3% vs 76.5%) the MET. The three most common pre-MET breaches were low SpO2 (48.0%), high pulse rate (39.8%), and low systolic blood pressure (29.0%) which were present for a median (IQR) of 15.4 (7.5-20.8), 13.2 (4.3-21.0), and 12.6 (3.5-20.1) hrs before the MET call, respectively. Patients with pre-MET breaches were more likely to need intensive care admission within 24 h (15.6 vs 11.9%), have repeat MET calls (33.3 vs 24.7%), and die in hospital (15.8 vs 9.9%).

Another study which supports the result of the current study done by Anna Adielsson *et al.* 2022, a study was conducted Outcome prediction for patients assessed by the medical emergency team: a retrospective cohort study; BMC Emergency medicine. Findings from this review indicated that there overall 30-day mortality was high (29.0%). We identified thirteen factors independently associated with 30-day mortality concerning; age, type of ward for admittance, vital parameters, laboratory biomarkers, previous medical history and acute medical condition. A MET risk score for mortality based on the impact of these individual thirteen factors in the model yielded a median (range) AUC of 0.780 (0.774-0.785) with good calibration. When corrected for optimism by internal validation, the score yielded a median (range) AUC of 0.768 (0.762-0.773). Among clinical variables available at the time of MET assessment, thirteen factors were found to be independently associated with 30-day mortality. By applying a simple risk scoring system based on these individual factors, patients at higher risk of dying within 30 days after the MET assessment may be identified and treated earlier in the process. Another one more study which supports the result of the current study done by Stephanie K. Sprogis *et al.* November 2023, a study was conducted that Clinicians' use and perceptions of the Pre-medical emergency team tier of one rapid response system: A mixed-methods study; Australian Critical Care: Findings from this review Observations identified 27 pre-MET events for 24 patients that involved 37 clinicians (nurses = 24, speech pathologist = 1, doctors = 12). Nurses initiated assessments or interventions for 92.6% (n = 25/27) of pre-MET events; however, only 51.9% (n = 14/27) of pre-MET events were escalated to doctors. Doctors attended pre-MET reviews for 64.3% (n = 9/14) of escalated pre-MET events. Median time between escalation of care and in-person pre-MET review was 30 min (interquartile range: 8-36). Policy-specified clinical documentation was partially completed for 35.7% (n = 5/14) of escalated pre-MET events. Thirty-two interviews with 29 clinicians (nurses = 18, physiotherapists = 4, doctors = 7) culminated in three themes: Early Deterioration on a Spectrum, A Safety Net, and Demands Versus Resources. There were multiple gaps between pre-MET policy and clinicians' use of the pre-MET tier. To optimise use of the pre-MET tier, pre-MET policy must be critically reviewed and system-based barriers to recognising and responding to pre-MET deterioration addressed.

Conclusion

This study explored use of the pre-MET form by nurses and doctors. There were multiple gaps between pre-MET policy and clinicians' use of the pre-MET tier, drawing attention to a host of system-based barriers. The three main findings were that clinicians variably used the pre-MET tier, nurses intervened to remediate pre-MET deterioration despite not always explicitly upholding hospital policy, and staffing and equipment constraints impeded pre-MET use. Recommendations for optimising the pre-MET forms include reviewing pre-MET policy, empowering nurses to respond to pre-MET deterioration within their scope of practice, and maximising hospital resources. Future research should examine pre-MET use across multiple sites, further define related roles and responsibilities of Nurses and explore patient safety implications of effective pre-MET forms use. The Present study results revealed Overall pre MET is 73.68% and MET is 26.32% in 3rd floor A & B Wards. Overall pre MET is 80.77% and MET is 19.23% in General Ward. Overall pre MET is 76.47% and MET is 23.53% in 1st Floor ward, General ward & 3rd Floor ward – 2024. Overall Mean percentage level of Pre MET & MET in wards is pre MET is 76.06% and MET is 23.94% in 1st Floor ward, General ward & 3rd Floor ward – 2024. So, the Nurse led Pre-Medical Emergency team response has been reduced the Medical Emergencies in wards at selected hospitals.

REFERENCES

Daryl Jones et al., Breaches of Pre-medical emergency team call criteria in an Australian hospital; Critical care resuscitation: 3 November 2023.

Anna Adielsson et al., Outcome prediction for patients assessed by the medical emergency team: a retrospective cohort study; BMC Emergency medicine: 2022.

Stephanie K. Sprogis et al., Clinicians' use and perceptions of the Pre-medical emergency team tier of one rapid response system: A mixed-methods study; Australian Critical Care: November 2023.

Kiley Nelson et al., Nurse-led Medical emergency response reduces code blue team activations in non-hospitalized patients; National Library of Medicine: April 2024.

Sing Chee Tan et al, Pre-medical emergency team activations-Patient characteristics, outcomes and predictors of deterioration: National library of medicine; November 2023

Fiona Winterbottom et al., A Patient safety solution: A Pre-post evaluation of a 24/7 Nurse-led Proactive Rapid Response Program; *International Journal of Critical care* volume 16 Issue 2: September 2022.

****