Alarm Management in Intensive Care Unit: A Quality Improvement Approach

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ABOUT

Medanta – The Medicity, founded by Dr. Naresh Trehan, is a 43-acre super-specialty hospital in Gurugram with 1,250 beds, 40 OTs, and 900+ doctors. Accredited by JCI, NABH, and NABL, it delivers high-quality, affordable care. Ranked India's best private hospital for six years, it is also among the world's top 250 hospitals.

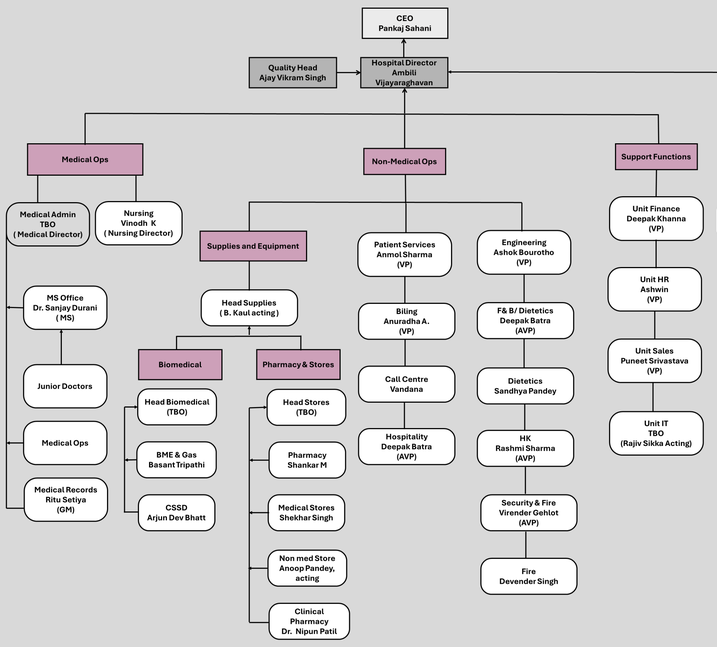
MISSION

Our mission is to deliver world-class health care services by creating institute of excellence by integreted medica care, teaching and research. We aspire to create an ethical and safe environment to treat all with respect and dignity.

VISION AND VALUES

The institute is governed under the guiding principles of providing affordable medical services to patients with care, compassion and commitment.

ORGANOGRAM



OBJECTIVE

This study aims to understand how nurses respond to clinical alarms in the Neuro ICU, focusing on how quickly and effectively they act when alarms go off. It explores the challenges they face—like alarm fatigue and rigid settings—and how these factors affect their response times. By observing real-time behavior and identifying where current alarm management falls short, the goal is to recommend practical, safety-focused improvements.

THEORETICAL LEARNING

- Communication in Healthcare – Understood structured communication planning for timely clinical responses (Ch. 2).
- ICU Operations – Learned ICU workflows, team roles, and monitoring systems (Ch. 9, Essentials of Hospital Services).
- Organizational Behaviour – Studied group problem-solving and coordination in high-pressure healthcare settings.
- Research Methodology – Gained knowledge in study design, sampling, and data analysis for hospital-based audits.

PRACTICAL LEARNING

- IPSG 2.2 Application – Assessed nurse response times to alarms, aligning with patient safety standards.
- COP.2 Integration – Identified care delays due to poor alarm management and linked it to care standards.
- Team Coordination – Applied OB concepts to analyze doctor-nurse collaboration during interventions.
- Research Execution – Used observational design, event-based sampling, and Excel tools for compliance analysis.

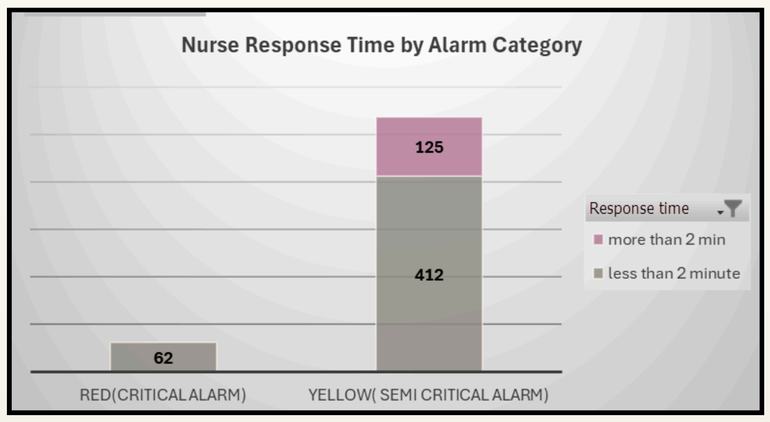
FINDINGS

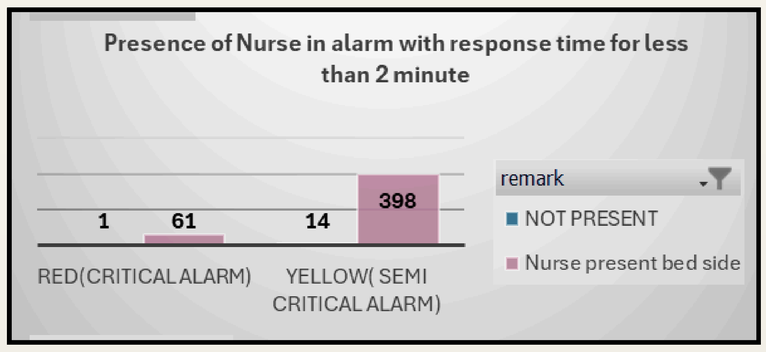
OBSERVATIONS-

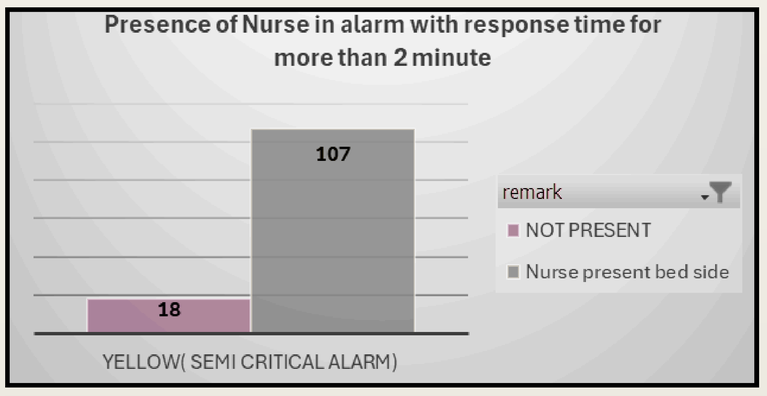
1. **Efficient Response to Critical Alarms (RED)**:
- Most RED alarms were responded to in under 2 minutes, reflecting strong emergency responsiveness in high-risk situations.
2. **Slower Response for Semi-Critical Alarms (YELLOW)**:
- A noticeable portion of YELLOW alarms had delayed nurse responses (>2 minutes), highlighting a potential gap in semi-critical alarm prioritization.
3. **Nurse Presence is High but May Not Reflect Timeliness**:
- While nurse presence at the bedside was high for YELLOW alarms, response delays suggest that presence does not always equate to immediate action.

METHODOLOGY

- **Design:** Observational study and primary data collection
- **Duration:** May and June 2025
- **Location:** Neuro ICU
- **Sampling Method:** Event Based Sampling
- **Tools Used:**
- Medical record audits and live data collection from patient files







CHALLENGES FACED

1. **Time management** while juggling multiple projects, audits, and reporting responsibilities across departments.
2. **Adapting to a clinical environment and** understanding complex hospital workflows and terminologies as a non-clinical observer.
3. **Technical challenges** in using hospital information systems (HIS) and advanced Excel tools for data compilation and analysis.
4. **Coordinating with clinical staff** who were often busy or unavailable for interviews or clarifications.

Suggestions:

- Regular alarm management training for ICU staff.
- Alarm escalation protocols to be visibly displayed.
- Assign authority to senior nurses for adjusting parameters.
- Periodic audits of alarm settings and nurse responses.
- Reduce non-actionable alarms by customizing thresholds.

SWOT

STRENGTH

1. Presence of centralized alarm monitoring systems for better visibility.
2. Availability of trained senior nursing staff during critical hours.
3. Adherence to clinical protocols and patient monitoring standards.
4. Regular presence of biomedical and ICU doctors for technical and clinical support.

WEAKNESS

1. Nurses lack authority to modify alarm settings, leading to delays in action.
2. Absence of structured and periodic alarm management training.
3. High dependency on default alarm settings, often not tailored to individual patient needs.
4. Limited awareness of alarm fatigue and its consequences among staff.

OPPORTUNITY

1. Implementing a structured training module for alarm prioritization and response.
2. Introducing intelligent alarm systems or filtering tools to reduce noise and false alerts.
3. Empowering senior nurses with controlled authority to adjust alarm thresholds.
4. Conducting regular audits and feedback sessions to track and improve response time.

THREAT

1. Alarm fatigue leading to desensitization and missed critical alarms.
2. Risk of patient harm or sentinel events due to delayed or ignored responses.
3. Staff burnout and increased stress levels due to overwhelming alarm frequency.
4. Potential non-compliance with JCI standards and related medico-legal risks..

MAJOR LEARNING DURING INTERNSHIP -

1. Gained hands-on experience in clinical and quality audits aligned with JCI standards.
2. Strengthened data analysis and reporting skills using Excel and HIS.
3. Understood hospital workflows across ICUs, MRD, OPDs, and specialty units.
4. Applied classroom concepts to real-world hospital projects and challenges.
5. Improved communication, teamwork, and problem-solving through daily coordination with staff and mentors.