



Research Article

IMPROVING NURSE RESPONSE TIME TO HIGH-PRIORITY CALL BELLS: A QUALITY IMPROVEMENT PROJECT IN THE PEDIATRIC WARD

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Abstract: Background: Delayed nurse responses to high-priority call bells pose substantial patient safety risks. Baseline evaluation in the Pediatric Ward at WDGH revealed an average response time of **4.8 minutes**, far exceeding the hospital benchmark of ≤ 2 minutes, resulting in delayed interventions, reduced patient satisfaction, and increased clinical risk.

Objectives: To reduce the average nurse response time to high-priority call bells to ≤ 60 seconds (hospital KPI ≤ 2 minutes) by September 2025 through workflow optimization, system monitoring, and staff training.

Methods: A quasi-experimental pre–post intervention design was used from July–September 2025. Interventions included development of a standardized call-bell response protocol, staff education, installation of visual alert systems, response-time logbooks, and weekly monitoring audits. Response time data were analyzed using descriptive statistics and trend analysis.

Results: The average response time improved steadily from **4.8 minutes (June baseline)** to **1.6 minutes by September 2025**, meeting the target of ≤ 2 minutes and reflecting a **67% improvement**. Staff compliance with the call-bell protocol increased from **60% to 98%**, and calls answered within ≤ 2 minutes increased from **42% to 94%**.

Conclusion: Standardizing workflow, improving alert visibility, and strengthening staff accountability significantly reduced response times and enhanced patient safety. The project achieved sustained results and is recommended for hospital-wide adoption.

Keywords: Nurse response time, call-bell system, patient safety, workflow optimization, pediatric nursing, quality improvement

INTRODUCTION

Prompt nurse response to call bells is a critical element of patient safety and satisfaction.

High-priority call bells, often triggered for urgent needs such as respiratory distress, postoperative pain, risk of falls, or sudden deterioration, demand immediate action.

Baseline monitoring in the Pediatric Ward revealed substantial delays, with nurses taking an average of **4.8 minutes** to respond to high-priority alerts—far beyond the recommended hospital KPI of ≤ 2 minutes. Factors contributing to delays included high workload, poor visibility of the call-bell indicators, lack of clear response roles, and absence of systematic monitoring.

Given the risk implications, the Nursing Quality Department (NQR), Nursing Administration, and Pediatric Ward leadership initiated a structured quality improvement (QI) project to improve responsiveness and create a standardized system for real-time monitoring and staff accountability.

Aim

To improve nurse response time to high-priority call bells in the Pediatric Ward by implementing standardized workflow processes and monitoring systems.

Objectives

1. Reduce average response time from **4.8 minutes to ≤ 2 minutes** within three months (July–September 2025).
2. Increase the percentage of calls answered within **≤ 2 minutes to $\geq 90\%$** .

3. Improve staff compliance with the call-bell response protocol to **$\geq 95\%$** .
4. Enhance call-bell visibility and functionality across all nurse stations.
5. Establish sustainable monitoring and feedback mechanisms.

METHODOLOGY

Study Design

A quasi-experimental pre–post QI design.

Study Setting

Pediatric Ward, Wadi Al-Dawasir General Hospital (WDGH).

Study Participants

All pediatric ward nurses responsible for responding to high-priority call bells.

Sample Size

All high-priority call bell activations recorded between June–September 2025 through the electronic call-bell system and response log sheets.

Intervention Process

The intervention began with a baseline gap analysis which confirmed prolonged response times and workflow inefficiencies. A standardized **Call-Bell Response Protocol** was developed to define urgency levels and expected response times. Staff were provided structured training and real-time bedside coaching to reinforce protocol adherence. To improve visibility, **visual alert lights** were installed at nurse stations, and malfunctioning indicators were repaired. A standardized **Response-Time Logbook** and weekly audits were introduced to track performance while supervisors provided immediate feedback to reinforce accountability. These structured interventions resulted in progressive, sustained improvement in nurse response times.

Timeline

Project Phase	Key Activities	Dates
Baseline Assessment	Data collection, KPI verification	June–July 2025
Protocol Development	SOP creation, approval	July 2025
Staff Training	Simulation, demos, orientation	July–August 2025
System Enhancement	Alert light installation, repairs	August 2025
Implementation & Monitoring	Weekly audits, feedback	August–September 2025
Post-Implementation	Evaluation, presentation	September–October 2025

Data Collection Tools

- Call-bell system timestamp reports
- Manual response-time logbook
- Staff compliance audit checklist
- Weekly KPI monitoring forms

Data Analysis

Descriptive statistics were used to calculate average response times and compliance percentages. Trends were visualized using run charts and linear improvement graphs.

RESULTS

Table 1. Key Performance Indicator (KPI) Summary

Indicator	Baseline (June 2025)	Target	September 2025	Status
Average Response Time (min)	4.8	≤ 2.0	1.6	Achieved
Calls Responded ≤ 2 min (%)	42%	≥ 90%	94%	Achieved
Staff Compliance with Protocol (%)	60%	≥ 95%	98%	Achieved

Table 2. Trend of Improvement (June–September 2025)

Month 2025	Average Response Time (min)	Target
June (Baseline)	4.8	≤ 2
July	3.2	≤ 2
August	2.3	≤ 2
September	1.6	≤ 2

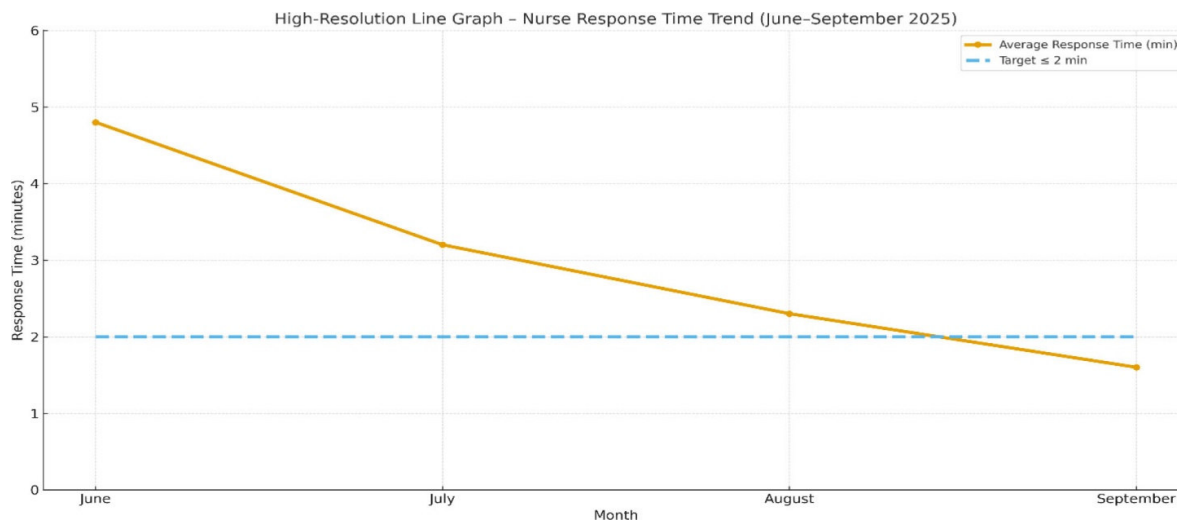
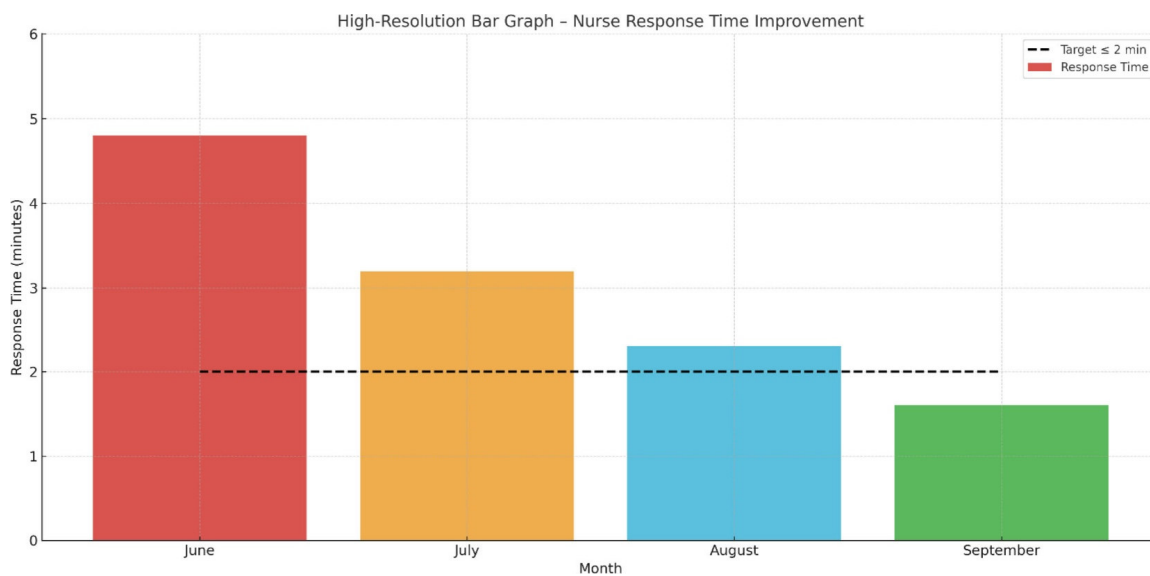


Figure 1. Trend of Improvement



DISCUSSION

The QI project demonstrated that structured workflow optimization, staff engagement, and system enhancements significantly improved nurse response time to high-priority call bells. The introduction of the Standard Call-Bell Response Protocol clarified expectations and standardized reactions. Visual alert systems improved environmental awareness, while training sessions increased staff competence and ownership.

The substantial improvement—reduction from **4.8 minutes to 1.6 minutes**—aligns with evidence that enhanced workflow design and monitoring improve responsiveness and patient safety. The real-time logbook and weekly audits supported accountability and provided rapid identification of delays and workflow barriers.

These results are consistent with similar studies demonstrating that nursing responsiveness is influenced more by system design and communication workflow than individual performance. Sustained improvement also indicates a shift in unit culture toward prioritizing urgent call-bell alerts as a critical safety KPI.

CONCLUSION

This project successfully achieved its aim of reducing nurse response times to high-priority call bells through protocol standardization, system improvements, and staff training. All indicators surpassed the targets, demonstrating improved

responsiveness, patient safety, and satisfaction. The model is scalable and recommended for hospital-wide implementation to promote rapid nursing intervention and enhance overall patient safety culture.

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