

An Evidence-Based Bundled Approach to Reduce Alarm Fatigue and Improve Telemetry Nurses' Knowledge

Jeffrey Jubilee, MS, RN, AGACNP-BC, ANP-C; Binu Koirala, PhD, MGS, RN



JOHNS HOPKINS
SCHOOL of NURSING

Background & Aims

More than 85% of medical devices alarm sounds are false alarms. Repetitive false alarms cause sensory overload and desensitization to alarm sounds, known as alarm fatigue (AF). AF leads to missed or ignored alarms and increases patient safety risks, including injury and death.

This project's purpose was to implement an evidence-based bundled approach to reduce false alarms and AF.

The aims were to:

- 1) determine the effect of AF on telemetry nurses,
- 2) increase AF knowledge among telemetry nurses, and
- 3) reduce the total number of false clinical alarms after the educational program



Methods

Design: One-group pre/posttest intervention

Setting: Mid-size hospital in the Atlantic Northeast U.S.

Sample: All telemetry unit nurses; alarm data from three patient beds with the highest alarms in a 24-hour period

Measures:

- **Alarm Fatigue Questionnaire (AFQ):** 13-items with 2 reverse scored; Likert scale: never (0) to always (4); range: 8-44; $\alpha = .77$
- **Alarm Fatigue Knowledge:** 3-items on AF familiarity, causes, and prevention; response options were yes (1) or no/unsure (0); items were analyzed item-by-item
- **Alarm data:** total number of telemetry alarms and the proportion that were false alarms before and after the intervention for seven days using *Phillips alarm system*

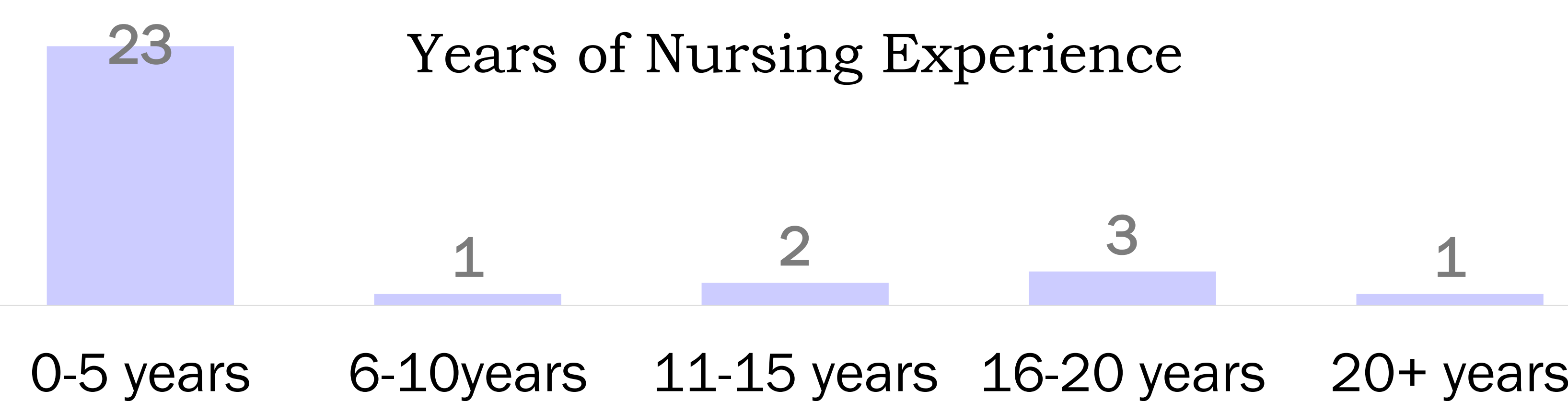
Analyses: Descriptive, Paired *t*-test, Wilcoxon signed rank, Chi-square

Intervention

The educational intervention program included an evidence-based bundled approach using four strategies: (a) alarm management; (b) alarm customization; (c) proper skin care and daily electrode change; and (d) timely alarm delay. The investigator trained each nurse on the bundle during a 30-minute, hands-on education session and demo.

Participants

There was a total of 30 participants. The majority were female ($n = 28, 93.3\%$) with at least a bachelor's degree ($n = 27, 90\%$) working full time ($n = 27, 90\%$) during the night shift ($n = 16, 53.3\%$).



Results: Aim 1 & 2

Table 1 shows the results for Aims 1 and 2. After the intervention, participants increased self-reported AF by approximately 1.4% (.74 points), but this was not statistically significant.

Additionally, the intervention did not change self-reported familiarity or causes of AF. However, the intervention did result in a statistically significant increase nurses' knowledge of AF prevention methods.

Table 1. Nurse Survey Results

	Pre-test	Post-test	t/Z
Aim 1: AF Questionnaire, <i>M(SD)</i>	26.1 (7)	26.87 (6.3)	0.56
Aim 2: AF Knowledge, <i>Mdn</i>			
Familiarity with AF	1	1	1.73
Causes of AF	1	1	1.73
AF Prevention Methods	0	1	4.12*

* $p < .01$

Results: Aim 3

There was a 2% decrease in false alarms after the intervention, which was statistically significant, $\chi^2 = 31.94, p < .01$

	False Alarms	True Alarms	Total Alarms
Pre	3,695 (99.3%)	27	3,668
Post	1,312 (97.3%)	37	1,349



Conclusion

Overall, the QI project findings did not result in statistically significant changes in AF or knowledge of AF familiarity and causes; however, the project did result in a statistically significant increase in ways to prevent AF and significant reductions in false clinical alarms. The small increase in AF is likely due to measurement error, not an actual increase in AF, because the total number of alarms and false alarms were decreased after the intervention.

The project demonstrated that teaching nurses techniques to prevent AF using alarm customization, proper skin care and daily electrode changes and timely alarm delays, make an impact. These techniques are aligned with the TJC NPSG to help reduce alarm fatigue in acute care settings. Many participants stated that they now realize the significant effect continuous alarms have on their clinical care and job performance as well as of their colleagues' performance.

Acknowledgements and References

The authors of this project wish to thank the nurse participants and stakeholders who made this project successful as well as Dr. Maria Cvach, who acted as a content expert and helped inform the design of the project.

Scan the QR Code to see the references. The rhythm image is from Sommers Schwartz, all others are royalty-free.

