Instructions for Continuing Nursing Education Contact Hours appear on page 98.

A Novel Approach to Reducing RN Distraction During Medication Access

Eric Wolak
Andrea Hill
Pam Ball
Loc Culp

Use of a noise-reducing headset to decrease distractions at medication stations was evaluated. Observational data demonstrated a statistically significant decrease in the frequency with which RNs were visibly distracted when using the headset.

Early reports by the Institute of Medicine (IOM, 2001; Kohn, Corrigan, & Donaldson, 2000) estimated up to 98,000 patient deaths occur each year from errors, with almost 2% of these medication related. However, James (2013) suggested through meta-analysis that 200,000 to 400,000 deaths occur annually from medical errors. Most hospital errors are attributed to system failures, with distractions that occur once every 2 minutes as the primary contributor (Institute for Safe Medication Practices, 2012). These statistics indicate a chasm still exists between designed and actual levels of quality in healthcare settings.

Significance of Research

Medication administration errors (MAEs) occur due to a breach of one of the seven rights of medication use: right patient, drug, dose, time, route, reason, and documentation. Due to the complexity of the medication administration process, MAEs remain third among causes of sentinel events leading to patient death or loss of function (The Joint Commission, 2015).

Distractions are a common occurrence in the healthcare setting and have been linked to medication errors (Cottney & Innes, 2015; Fore, Sculli, Albee, & Neily, 2013). A distraction is defined as anything that draws or diverts attention from achieving the originally intended goal (Beyea, 2014). Based on IOM (2001) recommendations, many hospitals have implemented No Interruption Zones (NIZs) for medication access stations but NIZs only offer a passive reminder not to interrupt.

Literature Review

CINAHL, Pubmed, and Google Scholar were searched with the following key words/phrases: *no interruption zone*, *interruption*, *distraction*, *medication*, *medication administration*, and *error* for original research published 2012-2015. Five articles were found that provided context to the study.

Passive visual cues have been the predominant topic in the literature for distraction reduction. In an observational study, Craig, Clanton, and Demeter (2014) evaluated the impact of a white vest worn by nurses during medication administration over a 2-week period in reducing interruptions. A convenience sample of 42 registered nurses (RNs) of 58 in the study area volunteered to wear the white vest daily between 8:00 and 10:00 a.m. Data analysis demonstrated a significant reduction in interruptions (p=0.004) from 2,355 to 1,359 after implementation of the vest. However, authors did not assess an active means of reducing distractions, as the white vest was only a visual cue.

Fore and coauthors (2013) evaluated impact of *Do Not Disturb* signs and an orange vest on distractions during medication administration. Over 11 weeks, nurses completed self-reported data collection on interruptions (N=97). Results demonstrated a statistically significant decrease (p<0.05) in distractions in addition to a concurrent decrease in

Eric Wolak, MSN, MHA, RN, NEA-BC, is Nursing Director for Medicine and Oncology Services, The University of North Carolina Hospitals, Chapel Hill, NC.

Andrea Hill, DNP, RN, is Inpatient Director, North Carolina Specialty Hospital, Durham, NC.

Pam Ball, BSN, RN, NE-BC, is Nurse Manager, The University of North Carolina Hospitals, Chapel Hill, NC.

Loc Culp, BSN, RN, CCRN, is Clinical Nurse IV, The University of North Carolina Hospitals, Chapel Hill, NC.

Acknowledgment: The study investigators would like to acknowledge Nathan Woody, BS, for his contribution in managing data and performing statistical analysis for this study.

Introduction

Contributing factors to medication errors include distractions, lack of focus, and failure to follow standard operating procedures. Passive interventions such as No Interruption Zones (NIZs) are intended to limit RN distraction while accessing medications; however, these interventions are often ignored.

Purpose

This study evaluated a novel approach to reduce noise distraction exposure at medication access stations by using a noise-reducing headset.

Method

For this observational study, potential distractions and distracted states were coded and compared from pre-interventional observations and post-interventional observations.

Findings

Of 206 observations (149 pre-implementation and 57 post-implementation), some form of potential distraction occurred 86% (n=177) of the time at the medication access station. Analysis demonstrated visibly distracted states decreased 61% (49.6% to 19.23%) with use of the headset (n=72); the difference was statistically significant (p<0.05).

Conclusion

This is the first known study that evaluated an active approach to reducing distractions at medication access stations through use of a headset. Results suggested the device could keep RNs from being distracted at medication access stations.

MAEs 3 months after the study, but not beyond. Again, this study only evaluated visual cues to help reduce distractions.

Freeman, McKee, Lee-Lehner, and Pesenecker (2013) bundled several passive visual tools to reduce distractions. They included a lighted lanyard that was activated during medication access and administration, NIZs, and support staff triage of telephone calls during peak medication administration times. Before the intervention, 59 observations of medication preparation were made; 194 interruptions were noted, an average of 3.29 during each medication administration encounter. In 40 post-intervention observations, 47 interruptions occurred (average 1.18 per medication administration encounter). Although authors found a reduced number of distractions after the intervention, statistical analysis was not performed. As with the other cited studies, only passive means of reducing distractions via visual cues were assessed.

Instead of adding passive visual cues to decrease potential detractions, Colligan, Guerlain, Steck, and Hoke (2012) evaluated adjustments to the work environment. This observational study occurred in a pediatric acute care unit with the medication station located centrally in the nursing station. This multiphase study measured the frequency of interruptions before and after intervention. Interventions included physical barriers surrounding the medication access station that reduced gathering near the station but still maintained sightlines from the station to patient rooms. Researchers observed distractions for 20 hours over 6 months before the study, and for 24 hours over 6 months after the study. Data analysis indicated interruptions decreased after the barrier was placed (128 to 99). Authors stated the decrease in total interruptions was not significant. The mean interruption rate was reduced significantly, however, from 1.4 to 0.27 (p<0.01). Types of interruptions (self vs. other, patient care vs. indirect patient care) did not vary significantly. Barriers did not address auditory distractions, and the study did not evaluate frequency of the distracted state.

Clinicians also frequently break passive NIZ protocol and are the primary initiator of distractions, creating concern over the utility of self-regulated NIZ behaviors. An observational study by Gorini and Pravettoni (2013) compared RNs' perceived medication administration protocol adherence to 29 independently observed behaviors. Over several months, 95 nurses' behaviors were observed during medication administration; 3,382 medication accesses were recorded. Results demonstrated RNs broke protocol more than 20% (n=688) of the time because of interruptions; more than 80% (n=557) of the interruptions were self-generated; RN-perceived adherence to protocol was 7.18% higher than actual practice (89.87% self-perceived adherence compared to 82.6% observed adherence). This study was only observational in nature with no intervention implemented.

This review of the literature found most interventions to reduce distractions at medication stations, especially in high-traffic areas, were passive in nature. Although these studies indicated passive interventions may reduce the number of intentional distractions, these interventions do not change how the clinician senses surrounding stimuli. The majority of the reviewed studies relied on cues meant to remind others not to interrupt and depended on self-imposed protocol behaviors. The current study uniquely compares the frequency of visible clinician distractions with commonly used passive NIZ techniques to an intervention that actively reduces stimuli experienced by the clinician.

Research Questions

This study evaluated three research questions: Will use of a noise-reducing headset worn by a clinician at the medication access station serve as a visual cue to not be distracted/disturbed in the task at hand? Will use of a noise-reducing headset worn by a clinician at the medication access station reduce the frequency with which the clinician is distracted from the task? What are staff opinions of distractions and the use of the headset in reducing distractions?

Operational Definitions

For the purpose of this study, the following definitions were used:

- *Potential distraction:* Any stimulus that could cause the clinician to lose focus on the current task
- *Intentional potential distraction:* Any potential distraction initiated by one person with the intent of getting the attention of another who is involved in a task (e.g., someone approaches and converses with a person removing medications from the medication station)
- *Unintentional potential distraction:* Any potential distraction that is not intentionally initiated with the purpose of getting another's attention (e.g., alarms, telephones ringing, nearby general conversation not intended for the clinician)
- *Visibly distracted state:* Any time the clinician performing a task stops to engage in another activity

Methodology

This observational study assessed use of a noise-reduction tool during medication access. Institutional Review Board approval of a university-affiliated hospital was obtained before implementation. Because this study was approved as an exempt review, signed consent for observations was not required.

Three units at a teaching hospital in the southeastern United States were identified for observation at medication access stations: a 16-bed medical-surgical unit, a 12-bed medicine progressive care unit, and an 18-bed medical intensive care unit. These units were chosen because medication access stations were located centrally in the nursing stations. Units also represented varying patient acuity and clinical environments (acute care through critical care). Passive NIZs, specifically red tape around the perimeter of the medication access station, had been in place for each of these units for several years. Study units had 107 nurses who were informed of the study and assured their decision to participate through use of the headset and completion of the surveys was voluntary. All recorded data were maintained in the locked office of the principal investigator; no identifying information was obtained with observations or completed surveys.

An observation tool was developed by the study team based on clinical experience as well as an understanding of the risks of distractions and daily exposures to them. This tool was trialed among the investigators by comparing data obtained during concurrent test observations. Reliability testing of this tool was not performed. Potential distractions were identified by expert opinion. In observing medication access, investigators coded any potential distraction and noted if the RN was visibly distracted by it. A hash mark was recorded on the data collection tool for each potential distraction during each observed medication access. Another hash mark was recorded for each observed distracted behavior. The same tool was used for observations before and after intervention. To measure RN perception and opinion of distractions at medication access stations, a pre-intervention survey and a post-intervention survey were created (see Table 1).

Investigators performed pre-intervention distraction observations in the study units for 2 months, observing over 2-hour increments during high medication administration times on day and evening shifts, as well as weekdays and weekends. Pre- and post-survey methodology was used to gain clinicians' opinions of the culture of distractions. Nurses on each study unit were provided a survey before being educated on use of a noise-reducing headset (see Figure 1). Surveys were placed in all RNs' unit mailboxes with instructions to deposit completed surveys in a locked box located in the staff lounge.

A headset was made available at the medication access stations for each study unit. Post-intervention observations using the same tool as pre-intervention observations then were performed only for staff choosing to use the noise-reducing headset (see Figure 2). Post-implementation distraction observations were made over approximately 2 months on day and evening shifts as well as weekdays and weekends with a focus on high medication administration times. Post-implementation surveys were distributed to all study unit RN staff via their unit mailboxes with instructions to deposit completed surveys in a locked box located in the staff lounge. Only RNs who had used the headset at least once in the previous month were instructed to complete this survey.

Findings/Results

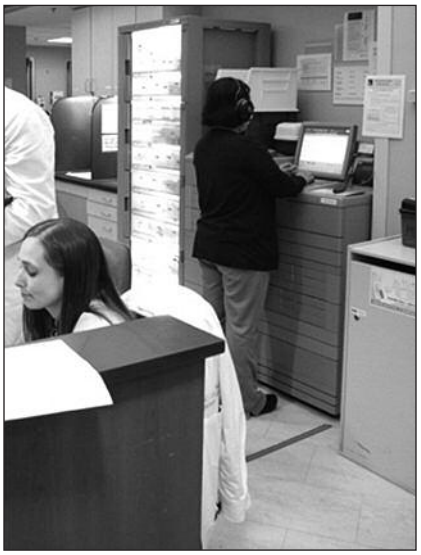
Behavioral responses to potential distractions during standard passive NIZ practice were observed to compare them to a more active approach to noise/stimuli reduction. Each hash mark on the observation tool was tallied to determine total number of observations before and after intervention, as well as potential distractions and noted distracted behaviors for the two study phases. Chi-square analysis was performed to determine possible significant difference between the two groups. During the study, 206 medication access observations were made; 149 medication access observations were made during pre-intervention period (NIZ only without headset) and 57 during post-intervention period (headset used in addition to NIZ). Some form of potential distraction occurred while the RN was at the medication access

TABLE 1.
Pre and Post-Intervention Survey and Survey Scores

Pre-Implementation Survey (*N*=30) *28% response rate*		Post-Implementation Survey (*N*=4) *<4% response rate*	
While accessing medications, I feel distracted most of time.	Strongly disagree (11) Disagree (14) Neutral (3) Agree (2) Strongly agree (0)	While wearing the headset, I felt distracted most of time.	Strongly disagree (0) Disagree (0) Neutral (0) Agree (1) Strongly agree (3)
How many times were you distracted at the medication access machine in the past month?	None (8) 1-5 (20) 6-10 (2) 11-15 (0) >15 (0)	How many times were you distracted while wearing headset?	None (0) 1-5 (2) 6-10 (0) 11-15 (0) >15 (2)
If I am approached while accessing medications, I request not to be distracted.	Always (5) Often (7) About half the time (3) Rarely (10) Never (5)	If a colleague began talking to me while wearing the headset, I requested him/her not to distract me.	Always (0) Often (0) About half the time (1) Rarely (0) Never (3)
		How many times did you use the headset during the study?	1-5 (4) 6-10 (0) 11-15 (0) >15 (0)

FIGURE 1.
Noise-Reducing Headset Used in Study

FIGURE 2.
Use of Headset During Medication Access



station 125 times during pre-intervention observations (83.9%). Some form of potential distraction occurred 52 times during post-intervention observations (91.2%). Some form of potential distraction occurred in 86% (*n*=177) of observations while an RN was accessing medications (see Table 2).

During pre-intervention observations, 40 (32%) potential distractions were intentional in nature. During post-intervention observations, 11 (21%) potential distractions were intentional (e.g., co-worker trying to get the attention of someone at the medication access station).

The headset did not contribute to a significant improvement in intentional distractions (p=0.139). Visibly distracted states also decreased during the post-intervention phase of the study. RNs were visibly distracted 62 times (49.6%) during pre-intervention phase and 10 times (19.23%) during post-intervention phase, a 61.2% improvement (p<0.05). This supports the premise the headset reduces exposure to potential distractions for the RN wearing the headset (see Table 2).

Thirty pre-intervention surveys were returned (response rate 28%). Of these, 83% (*n*=25) indicated disagreement or strong disagreement with the statement they felt distracted most of the time while at the medication access station. The majority also indicated they were distracted less than five times in the past month. Half (*n*=15) indicated they rarely or never stopped a colleague from distracting them (see Table 1). Four post-intervention surveys were returned (response rate 3.7%).

Discussion

Literature suggests visual cues are primary ways to reduce distractions at medication access stations (Craig et al., 2014; Fore et al., 2013;

TABLE 2.
Distraction Data Analysis

Total observations: N=206			
Pre-Implementation	**Post-Implementation**	**Percentage (%) Improvement**	***p*-value**
Observations	*Observations*		
149	57		
Potential distractions	*Potential distractions*		
125 (83.9%)	52 (91.2%)		
Intentional potential distractions	*Intentional potential distractions*		
40 (32%)	11 (21%)	34%	0.139
RN visibly distracted	*RN visibly distracted*		
62 (49.6%)	10 (19.23%)	61.2%	0.001

Freeman et al., 2013). However, as demonstrated in this study and cited in other studies, passive visual cues such as NIZs as standard practice in the study environments still allowed a high potential distraction rate (Craig et al., 2014; Fore et al., 2013; Freeman et al., 2013; Gorini & Pravettoni, 2013). This suggests NIZs may be ignored despite having been part of unit culture and practice for many years.

This study was different in that the intervention tool (headset) served as a passive visual cue and an active way to reduce environmental stimuli through noise reduction for the wearer. Although statistical analysis failed to support the premise the headset provides a visual reminder to not interrupt (*difference between intentional distractions from standard practice to post-intervention practice*), the study did demonstrate a reduction in the rate of intentional distractions. Results related to the second research question (*difference between visibly distracted states from standard practice to post-intervention practice*) suggested the headset may have provided an additional strategy to reduce potential distraction beyond NIZs. The headset may have reduced surrounding stimuli sufficiently to provide an environment in which the RN could focus better (see Table 2).

Although pre-intervention survey responses indicated the majority of RNs did not perceive they were exposed to distractions at the medication access station, observational data demonstrated potential distractions occurred 80%-90% of the time. Survey responses also indicated RNs perceived they did not get distracted; this was counter to observations, as almost half the time, RNs were observed responding to a distraction with only passive NIZs. This discrepancy in perception versus observation highlights a difference between what a person thinks is occurring and the response to it, rather than the actual amount of stimuli and the response toward them. This difference between perception and reality also was noted by Gorini and Pravettoni (2013). Notably, half the pre-intervention respondents indicated they would rarely or never stop an intentional potential distraction from occurring while at the medication access station, an indication RNs may need additional education on the dangers of distractions so they understand the importance of adhering to NIZ protocol.

Limitations

This study offers insight into distractions, especially in the context of medication access, and provides a unique approach to active (versus passive) reduction of potential distractions. However, interpretation of survey results is limited due to the small number of responses. Due to the stark contrast in return rates, investigators were unable to draw any comparisons between the pre-intervention and post-intervention survey results. Although observers remained discrete, RNs at the medication access stations may have changed their behaviors based on being observed. The observation tool was trialed among study investigators, but no statistical analysis of inter-rater reliability was performed. While enough data for statistical analysis were obtained, fewer RNs chose to wear headset for the post-implementation phase. A difference in opinions and behaviors was possible between those who chose to wear the headset and those who did not. Although the headsets were intended to reduce environmental noise, they did not eliminate stimuli completely. Nurses wearing the headsets might have heard some noise and become distracted. Finally, although visibly distracted states were identified, the observers could not assess the RNs' mental clarity at the time of potential distractions.

Nursing Implications

To minimize distractions, medication access stations should be located in a separate space. However, this is not possible for many nursing units. Nurses often access medications in the middle of busy nursing stations. Passive tools meant to provide a distraction-free area (e.g., NIZs) often are ignored (Gorini & Pravettoni, 2013). Results demon-

Instructions For Continuing Nursing Education Contact Hours

A Novel Approach to Reducing RN Distraction During Medication Access

Deadline for Submission: **April 30, 2019** **MSN J1705**

To Obtain CNE Contact Hours

1. For those wishing to obtain CNE contact hours, you must read the article and complete the evaluation through the **AMSN Online Library.** Complete your evaluation online and print your CNE certificate immediately, or later. Simply go to **www.amsn.org/library**
2. Evaluations must be completed **online** by April 30, 2019. Upon completion of the evaluation, a certificate for **1.2** contact hour(s) may be printed.

Learning Outcome

After completing this learning activity, the learner will be able to discuss use of a noise-reducing headset to decrease distraction at medication stations.

Learning Engagement Activity

Download and review:

Institute for Safe Medication Practices. (2012). *Side tracks on the safety express. Interruptions lead to errors and unfinished...wait, what was I doing?* Retrieved from http://www.ismp.org/Newsletters/acutecare/showarticle.aspx?id=37

Fees — *Member:* FREE ***Regular:*** $20

The author(s), editor, editorial board, content reviewers, and education director reported no actual or potential conflict of interest in relation to this continuing nursing education article.

This educational activity is jointly provided by Anthony J. Jannetti, Inc. and the Academy of Medical-Surgical Nurses (AMSN).

Anthony J. Jannetti, Inc. is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

Anthony J. Jannetti, Inc. is a provider approved by the California Board of Registered Nursing, provider number CEP 5387. Licensees in the state of California must retain this certificate for four years after the CNE activity is completed.

This article was reviewed and formatted for contact hour credit by Rosemarie Marmion, MSN, RN-BC, NE-BC, AMSN Education Director.

strated the frequency of distractions nurses experience as they are managing medications. In addition, this study suggested a noise-reduction headset can provide a visual cue to discourage interruptions as well as actively reduce stimuli around the wearer. Interestingly, incongruence between nurses' opinions and perceptions of their own behaviors toward distractions suggested a belief they were adhering to the NIZ protocol when they were not.

Recommendations for Future Research

Additional studies should assess more active means of reducing environmental stimuli, as well as opinions and beliefs regarding intentional potential distractions. Future studies should not only include observations of distractions, but also should explore RN perceptions and attitudes of the importance of minimizing/eliminating distractions during critical moments of care. Research also should explore a possible connection between distractions and medication errors.

Conclusion

This study adds to the current literature on NIZs and supports a more active approach to reducing distractions, while also highlighting incongruence between nurses' perceived and actual behavior toward NIZs. NIZs have become a ubiquitous tool to reduce distractions but, as evident in this study, a passive tool that often is ignored. This appears to be the first study to evaluate a visual and active means of reducing noise for nurses during medication access. MSN

REFERENCES

Beyea, S. (2014). *Interruptions and distractions in health care: Improved safety with mindfulness.* Retrieved from http://webmm.ahrq.gov/perspective.aspx?perspectiveID=152

Colligan, L., Guerlain, S., Steck, S.E., & Hoke, T.R. (2012). Designing for distractions: A human factors approach to decreasing interruptions at a centralized medication station. *BMJ Quality and Safety, 21*(11), 939-947.

Cottney, A., & Innes, J. (2015). Medication-administration errors in an urban mental health hospital: A direct observation study. *International Journal of Mental Health Nursing, 24*(1), 65-74.

Craig, J., Clanton, F., & Demeter, M. (2014). Reducing interruptions during medication administration: The white vest study. *Journal of Research in Nursing, 19*(3), 248-261.

Fore, A.M., Sculli, G.L., Albee, D., & Neily, J. (2013). Improving patient safety using the sterile cockpit principle during medication administration: A collaborative, unit-based project. *Journal of Nursing Management, 21*(1), 106-111.

Freeman, R., McKee, S., Lee-Lehner, B., & Pesenecker, J. (2013). Reducing interruptions to improve medication safety. *Journal of Nursing Care Quality, 28*(2), 176-185.

Gorini, A., & Pravettoni, G. (2013). Nurses' violations of a medication administration protocol in Italy: An observational study. *Clinical Nurse Studies, 1*(2), 80-89.

Institute of Medicine (IOM). (2001). *Crossing the quality chasm: A new healthcare system for the 21st century.* Washington, DC: National Academy Press.

Institute for Safe Medication Practices. (2012). *Side tracks on the safety express. Interruptions lead to errors and unfinished...wait, what was I doing?* Retrieved from http://www.ismp.org/Newsletters/acutecare/showarticle.aspx?id=37

James, J.T. (2013). A new, evidence-based estimate of patient harms associated with hospital care. *Journal of Patient Safety, 9*(3), 122-128.

Kohn, L.T., Corrigan, J., & Donaldson, M.S. (2000). *To err is human: Building a safer health system.* Washington, DC: National Academy Press.

The Joint Commission. (2015). *Sentinel event data – root cause by event type (2004-2014).* Oakbrook Terrace, IL: Author.