Innovative Approaches to Reducing Nurses' Distractions During Medication Administration

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ABSTRACT

Background: Contributing factors to medication errors include distractions, lack of focus, and failure to follow standard operating procedures. The nursing unit is vulnerable to a multitude of interruptions and distractions that affect the working memory and the ability to focus during critical times. Methods that prevent these environmental effects on nurses can help avert medication errors.

Methods: A process improvement study examined the effects of standard protocols and visible signage within a hospital setting. The project was patterned after another study using similar techniques. Rapid Cycle Testing was used as one of the strategies for this process improvement project. Rapid Cycle Tests have become a part of the newly adopted Define, Measure, Analyze, Improve, and Control steps at this particular hospital.

Results: As a result, a medication administration checklist improved focus and standardized practice. Visible signage also reduced nurses' distractions and improved focus.

Conclusion: The results provide evidence that protocol checklists and signage can be used as reminders to reduce distractions, and are simple, inexpensive tools for medication safety.

Today's health care setting is a demanding place that lends itself to errors because of the nature of the environment and the fact that humans are not perfect. The staff skill mix and experience levels vary, and there are numerous and complex functions expected of each individual. Technological equipment and procedures are constantly evolving. In such a setting, there are few predictive controls leading to the potential for many problems.

Successful strategies used by other industries for reducing errors have also been recommended for health care. Research that uses teamwork, decision support, and checklists borrowed from the airline industry can contribute value to health care safety efforts (Agency for Healthcare Research and Quality [AHRQ], 2001). Pilots follow checklists directing appropriate actions, and do not engage in conversation unrelated to the flight during take-off and landing. Airline research indicates that errors have occurred most often because of failures in this type of teamwork and coordination. Similar complex work encountered in health care also requires teamwork and other strategies borrowed from aviation (Helmreich & Merritt, 1998). Thus, nurses could potentially prevent errors by using safety checklists and other practices during critical times. Reducing unnecessary conversation and other distractions would be an additional mechanism for medication delivery safety. To that end, redesigning the healthcare workplace to avoid interruptions has the potential to prevent errors.

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ROLES AND FUNCTIONS

People in a work group frequently appreciate safety as a priority only if valued by the informal group leader. However, education also provides reasons and principles for changing behavior. Essentially, people will listen and abide by rules when provided with adequate grounds for the conduct (Geller, 2000). Ul-

timately, every member of the team is important for supporting safety within the nursing unit.

In an effort to maintain the medication administration schedule, nurses are often hurried, distracted, and interrupted during critical steps in the process. Hospitals in general tend to be very noisy settings with conversations occurring in crowded spaces. Nurses frequently perform more than one task at a time within this complex environment. For example, they often take phone calls while obtaining medications or charting. A basic understanding of factors affecting human learning and memory provides insight into error prevention strategies.

HUMAN FACTORS AND ERRORS

There are limits on human cognitive function and the degree of stimulus tolerated before processing breakdowns occur. Over-stimulation to any degree can affect precision, attention span, knowledge retrieval, concentration, and skill performance (Moray, 1994). There are two types of errors that affect functioning: (1) slips and lapses and (2) mistakes.

Slips and lapses result from a departure from the plan, whereas mistakes result from the wrong plan or choice. Slips and lapses include situations when an individual forgets a seemingly simple task or item after arriving in the intended destination. These often occur when functioning on "auto-pilot" with little thinking being implemented (Reason, 1991). People tend to equate a current circumstance to one they have seen before and automatically assume the same solution will work (Moray, 1994). For example, a slip occurs when a nurse proceeds to a patient's room without the requested pain medication because something caused a distraction or interruption as the nurse was entering the medication room.

Slips, memory lapses, and procedural violations affect the short-term memory. This is the working memory, which is used for attention, consciousness, and storing small amounts of information (Reason, 1991). Provided these parameters, distractions can cause nurses to lose focus at a critical time that can easily result in tragedy.

DISTRACTIONS

Distractions include anything that draws away, diverts, or disturbs attention from achieving a goal (Pape, 2002). Excessive input (information overload) and distractions compete for the individual's attention and fill the working memory where information is temporarily stored, thus affecting the ability to concentrate. Slips occur when an interruption prevents an intended action during information overload (Reason, 1991). For example, if a nurse agrees to turn a co-worker's patient while administering medication from an extensive list, a slip would occur if the nurse forgot to turn the patient. A mistake would happen if the nurse turned the wrong patient.

Another example of a mistake is if the nurse sees a familiar patient and decides that there is no need to check the patient's armband or allergy band. An error can easily be made because the patient was not the same individual the nurse thought, or the patient's allergies have changed.

A multitude of both internal and external factors affect experienced and novice nurses. However, distractions and information overload more often affect the new nurse or newly employed nurse (United States Pharmacopeia, 2003). Basically, the potential for slips and mistakes is a function of the internal environment, whereas distractions, interruptions, communication problems, time pressure, and noise are functions of the external environment. When the two combine, errors are more likely to occur (Reason, 1991). This is why it is important to consider both inherent human influences and external pressures.

Other factors contributing to errors include multitasking, hurriedness, and the effects of fatigue (United States Pharmacopoeia, 2000). The project that will be discussed was based on a study where focused protocols and teamwork significantly reduced distractions. Results indicated that distractions can be reduced by educating staff members to not distract nurses during critical times. Nurses' avoidance of conversation and use of checklists and signage also contributed to a reduction in distractions (Pape, 2002).

ORGANIZATIONAL CULTURE AND TEAMWORK

Culture is a set of norms, attitudes, and underlying values within any organization (Harrison & Shirom, 1998). If safety and error prevention, innovation, and teamwork are not valued by managers, they will not be valued by staff. Therefore, a standard of excellence must be created within the organization that ranks safety as a priority (Helmreich & Merritt, 1998; Moray, 1994).

Teamwork often suffers when social pressures cause teams to become too informal (Moray, 1994). Airline research indicates that errors have occurred most often because of failures in teamwork and coordination. As a result, the airline industry emphasizes teamwork and clear lines of authority. Conversation is avoided as pilots follow standard checklists directing appropriate actions (Helmreich & Merritt, 1998). Likewise, similar procedures can be effective at improving team function and reducing distractions for nursing staff.

PROTOCOLS AND VISIBLE SIGNAGE

Symbols and signage are influential in our society (Von Bertalanffy, 1969). Signs can serve as warnings of impending danger before the fact (Reason, 1991), and can be used as safety reminders to direct behavior (Geller, 2000). Signs provide information and can increase awareness of important situations.

Although a phenomenon known as habituation or ignoring a sign can occur, the value of the message usually prevents overlooking the meaning. People will not disregard a sign if they believe that the consequences of doing so are unacceptable (Geller, 2000). Thus, concerns regarding medication errors provide an incentive to abide by signs that ask staff to reduce interruptions.

A desired situation in any nursing care unit is to have as few distractions and interruptions as possible, low noise levels, and great teamwork. Today, some nursing departments have forgotten the importance of focus and concentration on error prevention. A multitude of physicians, residents, students, visitors, and co-workers are often seen interrupting nurses at inopportune times. Simply because they are standing still in front of the automated medication dispensing machine or medication cart, they fall prey to being interrupted.

Innovative methods that reduce distractions and promote focus are needed. Techniques similar to those used in a recent medication safety research study (Pape, 2003) were implemented in this recent performance improvement initiative.

PROCESS IMPROVEMENT

A Medication Safety Focus (MSF) group was formed at a large hospital in South Texas to determine appropriate actions for the reported increase in medication errors. The group included representatives from the Quality and Process Improvement and Risk Management Departments and nursing units. The Chief Nursing Officer recommended using interventions from the recent research findings by Pape (2002). Thus, the MSF group met to discuss the possibilities.

Initial medication error data were reviewed in terms of categories of error. Because the errors tended to involve the nursing administration portion of the medication process, the group first investigated the possible problems with lack of compliance with the "5 Rights plus one" campaign that was implemented earlier in 2003. The three highest volume and medication error categories that were targeted for improvement were omitted medications, wrong patient, and wrong dose provided.

The "5 Rights plus one" campaign included educating nurses about following the basic elements of medication administration: (1) the right medication, (2) the right dose, (3) the right route, (4) the right patient, (5) the right time, and (6) the right documentation. Nurses wore buttons as visual reminders, and signs were posted in key medication administration areas.

Prior to the campaign, an Ishikawa (also known as a fishbone) diagram had been drawn to depict the causes of errors. The MSF group re-evaluated the diagram to determine whether anything had been missed. Ironically, two areas noted on the diagram that had not been targeted for past interventions were interruptions and distractions. The 2003 United States Pharmacopeia MedMarx study also identified distractions as a leading cause of medication errors for the third year in a row, and recommended using interventions from the study by Pape (2002) and other measures to decrease distractions (United States Pharmacopeia, 2003). Thus, the group decided to pilot test similar medication safety protocols on selected nursing units. The medication safety strategies included a standard protocol checklist outlining optimal medication administration and the use of signs.

Another area of concern was that some nurses had been recently observed not using the paper medication administration record (MAR) when taking medications to patients. Instead, they were transcribing the medications from the computer screen onto a small piece of paper. Others were printing only the shorter version of the medication list, rather than the detailed MAR. Still other nurses were found not checking allergy or identification bands and were documenting medications prior to administration rather than afterward. The increase in reported medication errors and these observations provided baseline information to propel the MSF group forward to action. Based on findings from the previous study by Pape (2002), the group met several times to establish the final standard protocol steps:

1. From the electronic medical record keeping machine, print out MAR.
2. Obtain medications from the PYXIS (automated medication dispensing machine) and check medication name and dosage against MAR (med check #1).
3. Take medication (in packet) and MAR to bedside and check allergies and identification (ID) band (medical record number and have patient state name if alert; if not alert, check medical record number and date of birth—2 patient identifiers).
4. Check MAR against medication packet (med check #2).
5. Tell the patient the medication name and dose being provided while checking with MAR (med check #3).

6. Administer medications.
7. Document administration of the medication.

In addition. . .avoid distractions, interruptions, and conversations.

STUDY METHOD AND RESULTS

The results of this study were not intended to produce generalizability of findings. However, Institutional Review Board clearance was obtained by exemption, and the project was approved for publication. Selected nursing units were chosen because of staff willingness to participate in innovative strategies to improve medication delivery. Nurse educators were readily available for these units, offered to educate nurses, and were willing to monitor compliance.

Rapid Cycle Testing

A well-known first principle of quality is that "if you keep doing the same old things, you will get the same old results"; this often includes poor quality, increased expenses, and high employee turnover. A new process improvement strategy called Rapid Cycle Testing had recently been learned by many of the nurses at this facility. Rapid Cycle Tests (RCTs) of change is a process improvement methodology to make more effective changes quicker and easier. RCTs have become a part of the newly adopted Define, Measure, Analyze, Improve, and Control (DMAIC) steps at this particular hospital. These basic steps are:

1. Define the problem, causes, and goals. Determine the cost of doing nothing different versus the cost of improvement.
2. Measure the existing system with data—determine baseline first.
3. Analyze the gap between the existing situation and the goal.
4. Improve the system with creative strategies. Use the PDSA (plan, do, study, act) cycle and RCTs of change. Use data to validate improvements.
5. Control and sustain the improvement—establish standard operating procedures, guidelines, and policies (Langley, Nolan, Norman, Provost, & Nolan, 1996; Pande, Neuman, & Cavanagh, 2002).

DMAIC makes change more palatable and easier to implement (Pande, Neuman, & Cavanagh, 2002). Each RCT was conducted on the selected nursing units for 3 to 7 days. Based on the feedback from nurses, the protocol was "tweaked" (a small change was made) and another RCT was conducted for 3 to 7 days.

Baseline information for compliance with the appropriate delivery of medications was based in part on the increase in reported medication errors. Plus, nurse educators and the MSF group leader observed many nurses using poor techniques for medication delivery as previously discussed.

Nurses on the selected nursing units were educated regarding the protocol steps to be used during medication administration, and were provided small 4 × 5 inch checklist cards for ease of reference. The checklist cards contained the medication steps. Cards were also placed under plastic protectors on the medication carts or in the pocket of medication books. Prior to each RCT, nurses were instructed about any changes. Nurses were told that they would be randomly observed for compliance with following the steps.

Unit nurse educators and charge nurses from the five nursing units randomly observed staff nurses (N = 78) during medication delivery to patients. Nevertheless, random selection was also based on when nurses were most accessible to being observed at any given time, and how demanding the particular nursing unit was on any given day. Generally, the ability of the nurse educator to have time to conduct observations depended on staffing mix, shortage of nurses, and patient capacity and acuity. Sometimes, educators filled in for missing staff and were unable to conduct observations or were busy supporting nurses with acutely ill patients.

Medication delivery observations were conducted on weekdays during scheduled medication times from 7 a.m. to 7 p.m. Routine scheduled medication delivery times during which nurses were most often observed were 8:00 a.m., 10:00 a.m., 12:00 p.m., 2:00 p.m., or 4:00 p.m. The observers made every effort to observe different nurses each time, and to get a sampling of the varied practices. Depending on the nursing unit, and other factors, the number of observed nurses differed. After a week of observations, the MSF group met to evaluate success. Changes were made to the checklist wording and another RCT week of observation took place. After 3 weeks, there was a decline in the number of reported medication errors. Nurses also reported getting more work completed in less time.

Protocol Steps

Data received from the nurse educators were totaled manually and entered into SPSS 11.5 Statistical Package for the Social Sciences (SPSS, Inc., Chicago, IL). A descriptive analysis of the data displays compliance scores from direct observation of nurses using the protocol (Table 1, Fig. 1). Table 1 displays scores representing the number of times nurses were compliant or noncompliant with each of the protocol steps.

TABLE 1
NURSES' COMPLIANCE WITH FOLLOWING PROTOCOL STEPS

Checklist Item	Yes	No
Checked medication from PYXIS against MAR (med check #1)	61	20
Took medication to bedside in packet	56	24
Checked allergy band	50	13
Checked patient's ID band using 2 identifiers	60	18
Checked MAR with packet at bedside (med check #2)	51	27
Told patient medication name	45	28
Told patient medication dose	24	54
Checked medication against MAR third time (med check #3)	36	42
Administered medication	78	0
Correctly documented medication	78	0
Avoided distractions, interruptions, and conversation	63	16

PYXIS = automated medication dispensing machine; MAR = medication administration record.

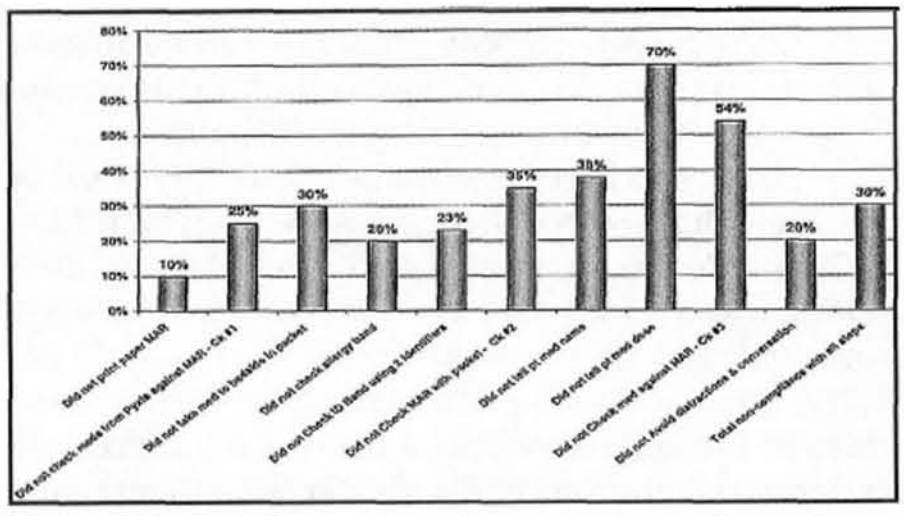

Figure 2. Percent of nurses' overall noncompliance with medication administration steps. MAR = medication administration record; PYXIS = automated medication dispensing machine; Med = medication; pt = patient.

Most nurses (90%) have become accustomed to printing the MAR forms and carrying them to patient rooms (Fig. 1). A large number of nurses were agreeable to check medications initially against the MAR (75%) when obtaining medications from the automated medication dispensing machine and with taking medications to the bedside in the packets (70%). However, they did not always conduct further verifications of the medications against the MAR (35% and 54%) (Fig. 2).

Most nurses checked the patient's allergy band (80%) or ID bracelet (77%). However, some nurses failed to tell

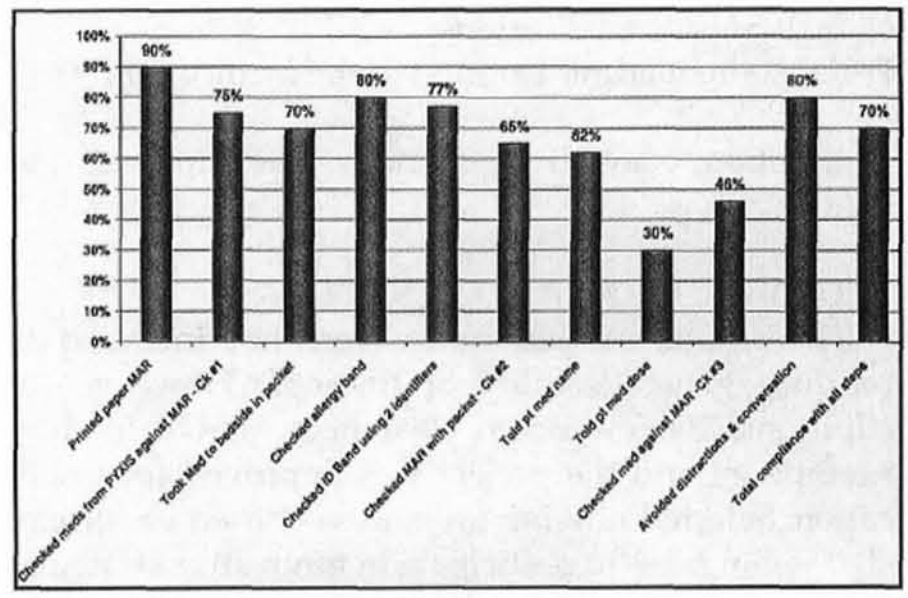

Figure 1. Percent of nurses' overall compliance with medication administration steps. MAR = medication administration record; PYXIS = automated medication dispensing machine; Med = medication; pt = patient.

the patient the medication name (38%), and many did not include the dosage (70%) of the medication. Some comments by nurses were that patients did not want to know the medication name or dosage, just whether it was their "heart pill" or "water pill."

Most of the nurses (81%) avoided distractions, interruptions, and conversation (Fig. 1). Overall, noncompliance was 30% with following all steps, which indicates improvement is needed (Fig. 2).

Signage

After nurses became accustomed to the protocol steps, signs were developed and posted. Nurses on the same five units were informed that the "Do Not Disturb" signs would be placed above the automated medication dispensing machines and medication carts. RCTs were conducted using two different signs for a period of 1 week for each sign. The final sign that seemed to be the most effective and acceptable to the staff was an 8½ × 11 inch sign that had a caricature of a person holding up one hand (Fig. 3). Participating nurses were asked to continue to use the protocol checklists, avoid conversation, and prevent distractions during medication administration. Physicians were notified at the Medical Executive Committee meeting regarding the likelihood that nurses would ask them to avoid interrupting during medication administration.

Instruments

The extent of distractions was measured with a self-report survey adapted from an instrument used in a previous study (Pape, 2002). In the previous

study, the medication administration distraction observation sheet (MADOS) contained 10 items as potential distraction sources, including physician, other personnel, phone call, other patient, visitor, missing medication, wrong dose medication, emergency situation, conversation, and external noise. The instrument was designed after performing a literature review of the domain content of distractions. The MADOS was validated based on expert opinions of nurses (N = 26) who validated the instrument using a survey rating scale based on Fehring's (1987) diagnostic content validity model. Using a research assistant during the pilot study, interrater reliability was established at .90, indicating a high interrater reliability quotient. The MADOS instrument was also validated in the pilot study by nurses' responses to an open-ended question on the demographic sheet regarding causes of distractions. Following the pilot test conducted for this study, an effect size of 1.32 for a power of .80 and an alpha value of .05 (one-tailed) were established.

The adapted self-report distraction instrument contained the following items: physician, other nurses, other personnel, visitor, missing or wrong dose medication, my uniform, conversation, computer problem, and external noise. As was conducted with the original MADOS, two items were added to reduce response bias when completing the survey. On the revised instrument, these two items were "my uniform" and "my computer."

Nurses were asked to circle the number corresponding to the degree of severity of distractions they had experienced both before and after signs were placed. The series of numbers ranged from 0 (not often) to 10 (extremely often). All information was provided anonymously and coded with numbers to protect confidentiality. A total of 10 nurses on three of the units completed the survey retrospectively for the time period before and after signs were placed (N = 20). Participants also completed demographic information.

A descriptive analysis of the data entered into SPSS 11.5 displays mean scores for the sign intervention.

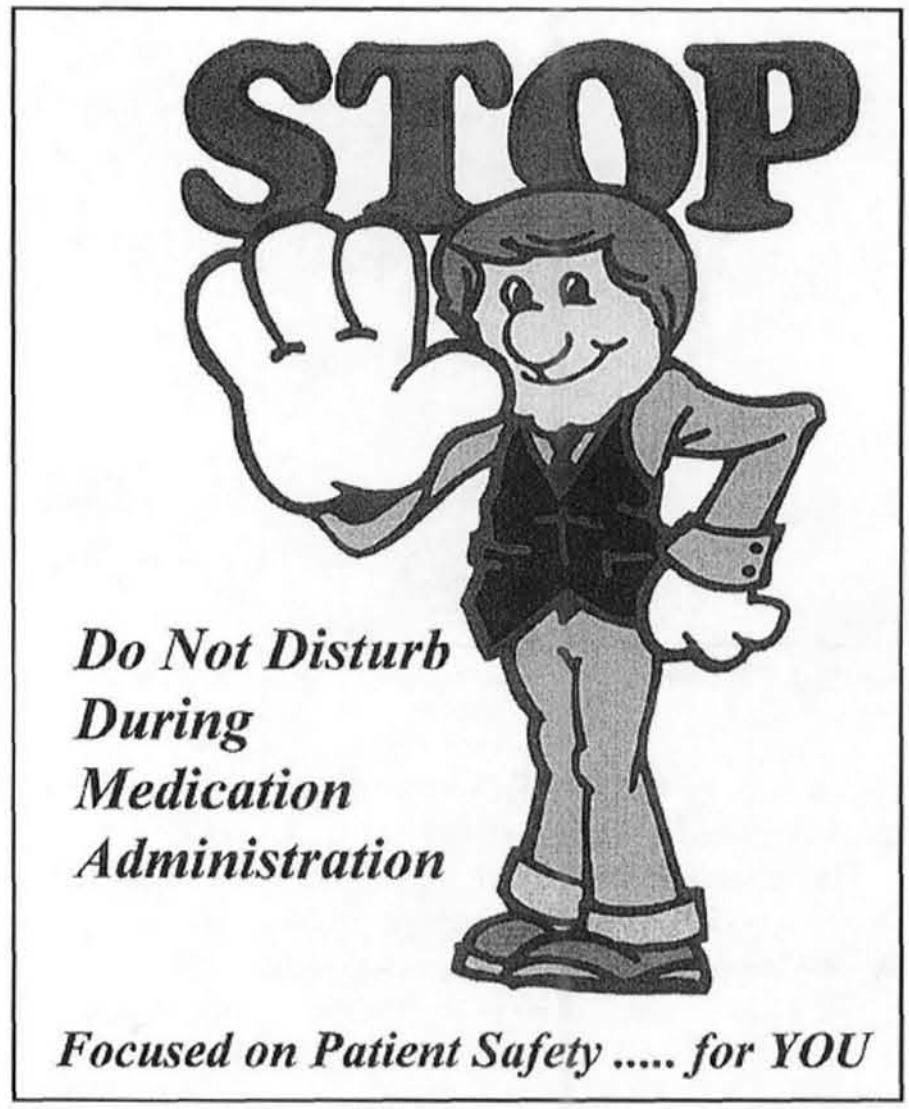

Figure 3. An example of a sign placed above automated medication machines and medication charts.

Demographic information included age, gender, ethnicity, education level, and years of experience. One participant did not supply her age for either before or after the intervention, resulting in two missing age values. Of those reporting ages, the range was from 24 to 53 years (mean [M] = 38; standard deviation [SD] ± 10.9). Both female (n = 14; 70%) and male participants (n = 6; 30%) were recruited. Participants were Hispanic (n = 12; 60%), Asian (n = 4; 20%), Anglo (n = 2; 10%), and African American (n = 2; 10%) (Table 2, Fig. 4). Educational level included associate degree (n = 10; 50%), diploma (n = 6; 30%), licensed vocational nurses (n = 2; 10%), and bachelor of science in nurs-

TABLE 2
FREQUENCY AND PERCENTAGE OF PARTICIPANTS BY ETHNICITY AND EDUCATION LEVEL

Ethnicity	Frequency	Percent	Education Level	Frequency	Percent
Anglo	2	10	LVN/LPN	2	10
Hispanic	12	60	Diploma	6	30
African American	2	10	ADN	10	50
Asian	4	20	BSN	2	10

LVN = licensed vocational nurse; LPN = licensed practical nurse; ADN = associate degree in nursing; BSN = bachelor of science in nursing.

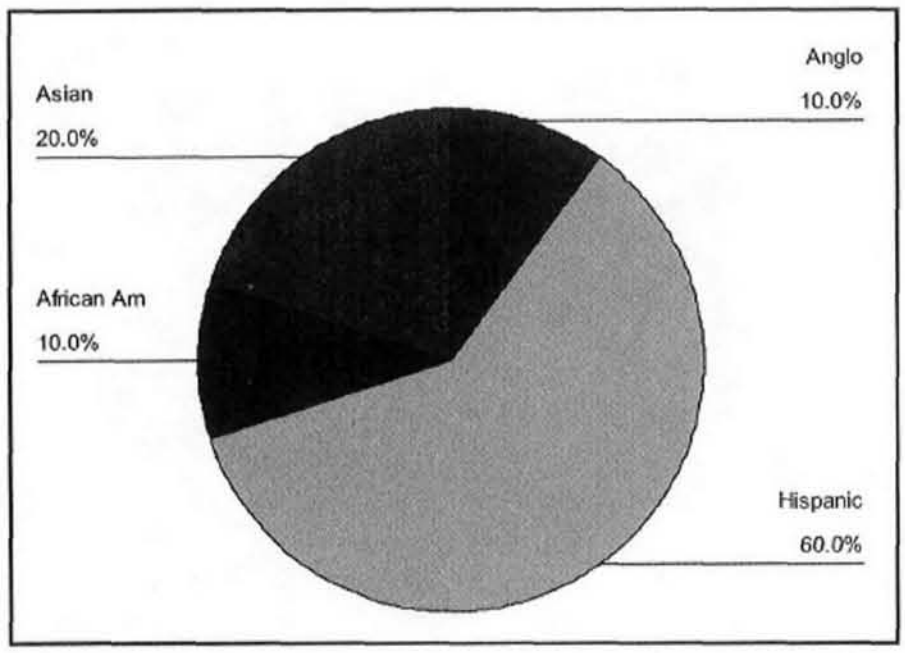

Figure 4. Pie chart depicting participant ethnicity by percent.

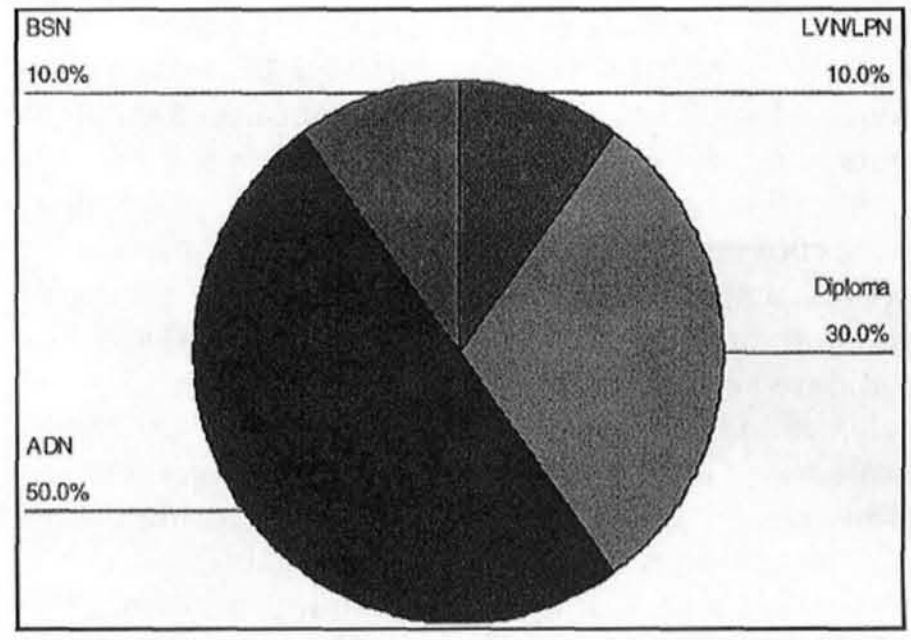

Figure 5. Pie chart depicting participant education level by percent. BSN = bachelor of science in nursing; ADN = associate degree in nursing; LVN/LPN = licensed vocational nurse/licensed practical nurse.

ing (n = 2; 10%) (Fig. 5). Years of nursing experience ranged from 1 to 25 years (M = 8.9; SD ± 9.1).

The greatest reduction in distractions after signs were placed was with the extent of distractions caused by other nurses. Other categories with important decreases after signs were placed were (1) other personnel causing distractions, (2) external conversation causing distractions, (3) the nurse conversed with someone unnecessarily, and (4) loud noises (Tables 3 and 4). The categories "needed medication missing" and "computer problem" did not appear to cause much distraction for nurses. Unfortunately, there was not much decrease in the physicians' score for interruptions before placing signs (M = 6.8; SD ± 2.2) compared with after placing signs (M = 5.9; SD ± 2.4) (Table 3).

In summary, the greater the distraction score, the more severe was the problem. Distraction score totals ranged from 26 to 56 (M = 42; SD ± 10.4) before signs were placed, and 16 to 45 (M = 31, SD ± 8) afterward (Fig. 6). The related samples *t* test was used to evaluate whether there was a statistically significant reduction in the extent of perceived distractions between the two time frames. The result indicated that the mean score for extent of distractions experienced after placing signs was significantly lower than the mean score for distractions experienced before placing signs (t = -14.33, df = 19, p = .000).

DISCUSSION

These results explain the importance of following standard protocols for medication delivery and the value of signage and teamwork to decrease distractions. For this study, the nurses' compliance with fol-

TABLE 3
MEAN SCORES OF DISTRACTIONS EXPERIENCED BEFORE AND AFTER SIGNS PLACED

	Physician, NP, PA	Other Nurse	Visitor	Other Personnel	Medication Missing or Wrong Dose Present	Problem With Computer	External Conversation or Nurse Conversed	Loud Noise
Before sign								
Mean	6.80	5.60	6.80	6.00	2.60	3.10	6.20	5.10
Standard deviation	2.150	2.989	2.394	2.261	2.757	3.213	2.700	2.514
After sign								
Mean	5.90	2.90	6.00	4.30	1.80	2.80	3.90	3.60
Standard deviation	2.424	1.792	2.160	1.703	2.486	2.821	2.183	1.265

NP = nurse practitioner; PA = physician assistant.

TABLE 4
MEAN SCORES FOR MOST REDUCED DISTRACTION CAUSES BEFORE AND AFTER SIGNS PLACED

	Loud Noise	External Conversation or Nurse Conversed	Other Personnel	Other Nurse
Before sign				
Mean	5.10	6.20	6.00	5.60
Standard deviation	2.514	2.700	2.261	2.989
After sign				
Mean	3.60	3.90	4.30	2.90
Standard deviation	1.265	2.183	1.703	1.792

lowing the protocol steps checklist for correct medication administration was mixed. However, there was a significant decrease in the number of distractions after placement of the "Do Not Disturb During Medication Administration" signs.

Still, some more experienced nurses continue to resist following the protocol, stating that they did not make mistakes with the old way they were doing things and that the steps take too long. However, most nurses admit that the steps are the correct way to administer medications, and many liked having the checklist on the medication cart as a reminder. Nurse educators appreciated knowing that nurses knew what was expected as standard operating procedure at the hospital.

Prior to implementation of the protocol steps, some nurses were rewriting medications and dosages from the computer screen onto other sheets of paper. Their reasoning was that they could have all information on one sheet and not have to carry the MAR forms. They also said that it saved the paper that would be needed when printing the MAR forms. However, transcription errors can occur easily when such a list is handwritten rather than printing the MAR. The cost of paper is minimal in comparison to the cost of medication errors.

Currently, nurses are more aware of the importance of following the correct procedures. Still, improvement is needed with consistency of taking medications to the room in the unit dose packets. Some nurses opened several packets in plastic medication cups and carried the medication cup to the patient's room. This practice can make it difficult to double check the intended medication name and dose against the actual package if the patient asks questions, or when attempting to remove a medication from the cup if the patient refuses a dose.

Mistakes can easily happen if the nurse does not check the patient's ID band each time medications are

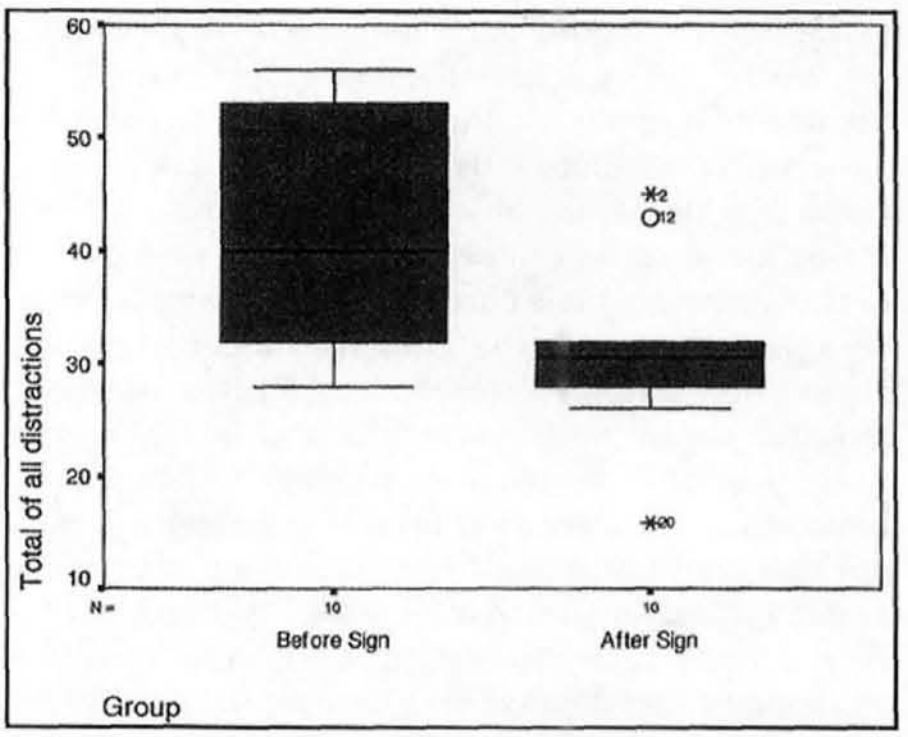

Figure 6. Boxplot depicting mean scores for total distractions before and after placement of signs.

administered, instead of only the first medication time of the day. Errors can also occur if the nurse administers medications without knowing the patient's medication allergies. Educating the patient about the name and dosage of the medications is important so he or she can be informed and also able to question a wrong order if needed. In addition, the patient becomes more familiar with the names of the medications most likely to be prescribed on discharge from the hospital. Although most nurses are becoming accustomed to the 7-step protocol, overall conformity remains to be seen.

The greatest reductions in distractions were those caused by (1) other nurses, (2) other personnel, (3) conversation, and (4) loud noises. Many nurses still complain that physicians and residents interrupt them regardless of whether they are doing something important. More education is needed among all staff regarding the need to decrease distractions and interruptions

for nurses during medication administration. Another important advantage of reducing distractions was in allowing nurses to complete medication delivery more quickly and get on with other patient care needs.

The MSF group functioned effectively as a team during this project. The potential exists for improving other aspects of medication delivery in this facility using the DMAIC model and RCTs. One member of the focus group stated her enjoyment of the group collaboration and the suggestions bounced off each other during meetings. From the initial ideas spearheaded by the group leader to the committee working to bring it together for patient safety and for the Joint Commission on Accreditation of Healthcare Organizations site visit, it was quite an accomplishment. Other members were glad they could participate in this process improvement project. It gave them more appreciation for research as it applies to the real world of nursing. Finally, nurses are more satisfied that they have permission to ask peers and physicians to not disturb them during medication administration.

The MSF group has currently become a permanent subcommittee under the Nursing Practice Council. During new employee orientation, nurses are being educated regarding the standard practices using the protocol steps to be followed during medication administration and provided revised yellow 4 × 5 inch checklist cards for ease of reference. They are also instructed about remaining alert to the "Do Not Disturb" signs. Emphasis is also being placed on the need for everyone to coordinate efforts at discovering system problems contributing to medication errors.

CONCLUSION

Currently, staff nurses are under increasing pressures almost daily, with numerous and complex functions expected of each individual. Medication errors often occur because of high noise levels, distractions, interruptions, ineffective communication, lack of focus, and poor teamwork.

Safety begins with strong leadership and management principles. Employees will emulate the attitude and follow the policies of those in administrative and leadership roles. Evidence-based strategies borrowed from the airline industry can prevent errors within the nursing unit. Nurses need to feel empowered to speak up for themselves to discourage unwanted interruptions and conversation while they are obtaining and administering medications. The protocol checklist and signs on nursing units for improving focus and reducing distractions proved to be valuable tactics. Such strategies are simple and inexpensive tools for improving focus during the medication administration process. Among the lessons learned were that nurses gained an appreciation for standardization in practice.

The fact that the impact was felt after only a short time is important for continued success, and for use in other institutions. Effective signage and standard protocols should be used in other hospitals to reduce distractions, interruptions, and noise levels. More research is needed to find simple, less expensive methods to reduce errors and advocate and empower nurses to make changes. These and other such strategies could help the current nursing shortage as more nurses find satisfaction and appreciation of their value to the healthcare team.

REFERENCES

Agency for Healthcare Research and Quality. (2001). *Evidence report/technology assessment, number 43: Making health care safer: A critical analysis of patient safety practices summary*. Retrieved September 2, 2003, from http://www.ahrq.gov/clinic/ptsafety/summary.htm.

Fehring, R. J. (1987). Methods to validate nursing diagnoses. *Heart and Lung, 16*, 625-629.

Geller, E. S. (2000). *The psychology of safety handbook*. Boca Raton, FL: Lewis Publishers.

Harrison, M. I., & Shirom, A. (1998). *Organizational diagnosis and assessment: Bridging theory and practice*. Thousand Oaks, CA: Sage Publications.

Helmreich, R. L., & Merritt, A. C. (1998). *Culture at work in aviation and medicine: National, organizational and professional influences*. Brookfield, VT: Ashgate Publishing.

Langley, G. J., Nolan, K. M., Norman, C. L., Provost, L. P., & Nolan, T. W. (1996). *The improvement guide: A practical approach to enhancing organizational performance*. New York: Wiley & Sons.

Moray, N. (1994). Error reduction as a systems problem. In M. S. Bogner (Ed.), *Human error in medicine: Thinking/problem solving* (pp. 67-91). Mahwah, NJ: Lawrence Erlbaum Associates.

Pande, P. S., Neuman, R. P., & Cavanagh, R. R. (2002). *The six sigma way: How GE, Motorola, and other top companies are honing their performance*. New York: McGraw-Hill.

Pape, T. M. (2002). *The effect of nurses' use of a focused protocol to reduce distractions during medication administration*. Doctoral dissertation, Texas Woman's University, Houston, Texas.

Pape, T. M. (2003). Applying airline safety practices to medication administration. *Med-Surg Nursing: The Journal of Adult Health, 12*(2), 77-93.

Reason, J. (1991). *Human error*. Cambridge, England: Cambridge University Press.

United States Pharmacopeia. (2000). *Summary of the 1999 information submitted to MedMarx: A national database for hospital medication error reporting*. Retrieved August 1, 2000, from http://www.usp.org/medmarx.

United States Pharmacopeia. (2003, September). Distractions contribute to medication errors. *CAPSLink*. Retrieved September 2, 2003, from http://www.usp.org/pdf/patientsafety/capsLink2003-09-01.pdf.

Von Bertalanffy, L. (1969). *Robots, men and minds: Psychology in the modern world*. New York: George Braziller Publishers.