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Prospective application of the interdisciplinary bedside rounding checklist 'TEMP' is associated with reduced infections and length of hospital stay

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ABSTRACT

Protocols that enhance communication between nurses, physicians and patients have had a variable impact on the quality and safety of patient care. We combined standardised nursing and physician interdisciplinary bedside rounds with a mnemonic checklist to assure all key nursing care components were modified daily. The mnemonic TEMP allowed the rapid review of 11 elements. T stands for tubes assuring proper management of intravenous lines and foleys; E stands for eating, exercise, excretion and sleep encouraging a review of orders for diet, exercise, laxatives to assure regular bowel movements, and inquiry about sleep; M stands for monitoring reminding the team to review the need for telemetry and the frequency of vital sign monitoring as well as the need for daily blood tests; and P stands for pain and plans reminding the team to discuss pain medications and to review the management plan for the day with the patient and family. Faithful implementation eliminated central line-associated bloodstream infections and catheter-associated urinary tract infections and resulted in a statistically significant reduction in average hospital length of stay of 13.3 hours, one unit achieving a 23-hour reduction. Trends towards reduced 30-day readmissions (20% down to 10%–11%) were observed. One unit improved the percentage of patients who reported nurses and doctors always worked together as a team from a 56% baseline to 75%. However, the combining of both units failed to demonstrate statistically significant improvement. Psychologists well versed in implementing behavioural change were recruiting to improve adherence to our protocols. Following training physicians and nurses achieved adherence levels of over 70%. A high correlation (r^2=0.69) between adherence and reductions in length of stay was observed emphasising the importance of rigorous training and monitoring of performance to bring about meaningful and reliable improvements in the efficiency and quality of patient care.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Checklists are known to improve the quality of patient care when reliably implemented; however, checklists have rarely been combined with standardised interdisciplinary bedside rounds to assure meaningful face-to-face communication and daily adjustments of nursing care.

WHAT THIS STUDY ADDS

⇒ The combining of an interdisciplinary bedside rounding programme with a verbal checklist mnemonic designed to address daily the multiple components of nursing care eliminated nosocomial infections due to central intravenous lines and foley catheters, resulted in a statistically significant reduction in hospital length of stay and demonstrate a trend towards reduced 30-day admissions. Most important the recruiting of psychologists to assist in achieving high rates of adherence proved to be a critical intervention as evidenced by the strong correlation between protocol adherence and reductions in hospital length of stay.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ To achieve meaningful improvements in the quality and safety of patient care in the hospital wards checklists should be combined with a standardised rounding protocol to assure face-to-face communication. Given the strong correlation between adherence and outcome, the introduction of standardised protocols needs to be accompanied by rigorous training interventions that include close monitoring of performance to assure faithful adherence.

BACKGROUND

The problem

Reducing adverse events, improving the quality and efficiency of patient care, and improving patient satisfaction are major goals for all hospital systems.

Available knowledge

Hospital systems have attempted to address these issues by applying standardised approaches to patient care. Bedside checklists have been used to achieve these goals

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and can encourage changes in patient management including, early removal of invasive devices, and the more appropriate ordering of diagnostic tests.[1–3] Checklists can also improve nurse and physician understanding of the patient care plans,[4] and their use has been accompanied by shorter lengths of hospital stay.[4 5] Reliable adherence to a bedside checklist is challenging; failure to use them occurs if the attending physician fails to promote their use and if the checklist is perceived as too time-consuming or too difficult.[6]

Bedside interdisciplinary rounds have the potential to improve communication and outcomes through enhanced structure and patient engagement,[4] and are the ideal system for incorporating a bedside checklist.[7] Several studies have shown that structured interdisciplinary rounds can lead to a significant reduction in patient adverse events,[8 9] and there are multiple individual studies demonstrate that multidisciplinary rounds can improve metrics such as length of stay, readmission rate and earlier discharge times.[10–21] While systematic reviews show that interdisciplinary rounds almost universally improve staff satisfaction, improvements in patient satisfaction have been variable.[22]

Rationale

A multidisciplinary committee consisting of nurses, physicians, administrators and patients was charged with improving the total patient experience and the committee identified 11 issues that need to be addressed daily at the bedside. We created verbal checklist that included all 11 components that the patient care teams should address to improve the patient experience.

First the checklist letter T addresses what tubes the patient has in place and whether they can be removed. A major cause of morbidity and mortality is central line infections, and removal of unnecessary central lines can save lives and shorten the length of stays (LOS).[23] Early foley catheter removal reduces the incidence of catheter-associated urinary tract infections (CAUTI)[24] and can reduce the costs of hospital admission.[25] The Society of Hospital Medicine and ABIM have identified unnecessary foley catheters as non-value-added activities that should be curtailed as part of their 'Choosing Wisely' recommendations[26]

Next, the checklist letter E addresses the basic activities of life that often deteriorate in hospitalised patients. Lack of exercise is a common state among hospitalised patients who are too often left on bedrest. Inpatient physical activity improves psychological well-being, and improves physical function and the quality of life following discharge from the hospital.[27] Proper eating is another important component for healing and for improving patient satisfaction. Nutritional decline in elderly patients during and immediately after hospitalisation is common[28] and barriers to adequate food intake are frequent.[29] The third basic function the team needs to address is excretion or bowel movements. Hospitalised patients are exposed to a number of conditions that increase the likelihood of constipation and appropriate early therapeutic intervention is important for each patient's sense of well-being.[30] Adequate sleep is the final vital need that should be addressed. Excess light and noise, as well as early morning blood drawing interfere with sleep.[31]

The third letter M emphasises the importance that appropriate monitoring of hospitalised patients. Both continuous telemetry and excessive monitoring of blood chemistry are among the top five wasteful orders identified by the Society of Hospital Medicine and American Board of Internal Medicine in their 'Choosing Wisely' Campaigns[26 32] With the emphasis on early alerts for sepsis, frequent vital signs are now emphasised,[33] however, the frequency of vital signs should be adjusted to reflect the severity of each patient's illness.

The final letter P of the checklist addresses pain control and assures that each patient understands their plan of care for the day. To create an effective pain relief regimen effective communication between the physicians, nurses, patient and family members is critical.[34] This approach prevents misunderstanding and assures the coordination of pain management. Empowering patients to provide input into their care and encouraging self-management requires that patients understand the rationale behind their treatment plans, and that they understand their daily plan of care. Patient surveys have revealed a strong desire by patients to be actively involved in creating the plans for their care.[35] However, shared decision making is challenging, and requires standardised communication strategies.[36]

We also created a standardised bedside rounding protocol that assured face-to-face communication between the bedside nurse, hospitalist and patient to ensure the effective application of the checklist. Previous studies of checklists and bedside rounds have not explicitly reported on the level of adherence to structured rounds or checklists. To address this concern, we created a training and monitoring programme that markedly improved protocol adherence.[37] We predicted that increased adherence to standardised rounds and the bedside checklist would reduce associated central line-associated blood stream infections (CLABSI) and CAUTI, shorten hospital length of stay, reduce readmission rates and improve patient satisfaction.

Specific aims

Reduce adverse events and Improve length of stay, readmission rates and patient satisfaction scores by effectively and consistently applying standardised bedside rounds that include an 11-component bedside checklist on two medical surgical units in a staggered time frame.

METHODS

Creation of the bedside checklist

After being provided with a list of management issues by the Patient Experience Committee, hospitalists and nurses met to create a bedside written checklist that

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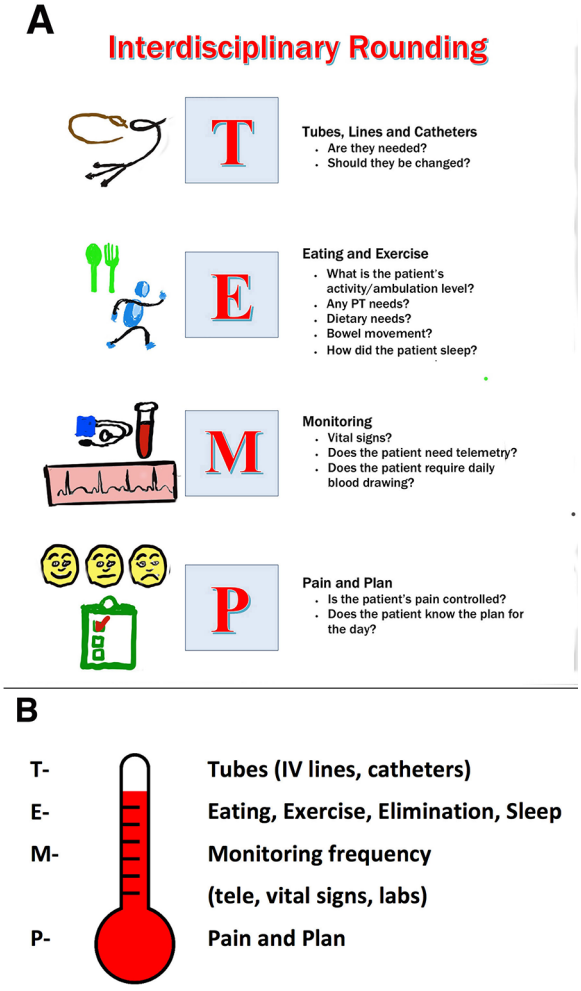

Figure 1 Drawings illustrating the elements of TEMP created by the nursing staff. TEMP card posted on the floors. TEMP card posted on each workstation on wheels.

included a checkbox for each component. This resulted in the following checklist containing 11 components:

1. Foley.
2. Central venous catheter.
3. Activity and need for physical therapy.
4. Diet.
5. Bowel movements.
6. Sleep.
7. Telemetry.
8. Vital sign frequency.
9. Blood samples monitoring.
10. Pain control.
11. Daily management plan.

In a preliminary pilot study hospitalists and nurses found a physical checklist required additional time on rounds to fill out the form. The creation of a checklist that could be recalled from memory was preferred and the senior author (FSS) developed a simple mnemonic that organised the key elements of the bedside checklist into four categories making it more cognitively friendly and easily memorised. The nurses on both floors embraced this mnemonic and created two different drawings that included each of the key components. Figure 1A is a laminated card displayed in each medical unit and figure 1B shows the small card that was taped to each mobile computer on wheels.

Box 1 Example of typical TEMP dialogue

T- Tubes
Nurse, 'Mr. Jones had a right internal jugular (IJ) line placed in the ICU 4 days days ago'.
Physician, 'Let's place a peripheral intravenous today so that we can remove the IJ line'.

E—Exercise, Eating, Elimination, Sleep.
Nurse, 'He was out of bed to chair with PT this morning. His last BM was 3 days days ago'.
Physician, 'Mr. Jones let's try to have you eat all meals in a chair today. I will write for a bowel regimen'.

M—Monitoring (telemetry, vital sign frequency, daily blood tests).
Nurse, 'Mr. Jones is on telemetry. He has been receiving vs every 4 hours. Can we change that to once per shift? He has been getting daily CBC.
Physician, 'I can d/c the telemetry. I will change the vs once per shift and the labs to every other day'.

P—Pain and Plan
Nurse, 'Mr. Jones has no pain'
Physician 'I am pleased to learn that you have no pain. Mr. Jones, let's review the plan for today'.

Implementation of the TEMP checklist

The checklist and a standardised rounding protocol were implemented in two medical surgical wards beginning in medical surgical unit on 1 on 18 July 2019 and continuing until 5 December 2019. This intervention was followed 1 month later by implementation on medical surgical unit 2 beginning 14 August 209 and ending 5 December 2019. These training interventions were preceded by a period of observation following a verbal description of the TEMP rounding system from 16 April 2019 to 17 July 2019 for unit 1 and from 16 April 2019 to 13 August 2019 for unit 2.

The TEMP checklist was incorporated into our standardised daily bedside interdisciplinary rounds. (Box 1) At 9:15 AM each morning rounds began. For each patient, the bedside nurse, hospitalist physician and charge nurse huddled around the patient's bed. First the physician examined the patient and inquired about changes in symptoms and the nurse was asked to describe any overnight events. The physician then reviewed the findings and treatment to date and outlined the management plans for the day.

Next the nurse verbally reviewed the TEMP checklist with the patient and physician. Justifications for central lines and foley were reviewed and, if no longer required, ordered to be discontinued at the bedside. The level of each patient's physical activity was advanced whenever possible, and the diet was discussed with the patient and nurse. Issues of constipation and sleep were addressed. The need for telemetry and a potential reduction in vital

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sign frequency was discussed as was the need for daily blood draws. The patient was asked about pain and pain medications adjusted to maintain a pain level of 4 out of 10 or less. Finally, the patient was asked if they understood the plan for the day and asked to summarise the plan in their own words. Any omissions or misunderstandings were corrected by the nurse or physician. After TEMP, the plan for the day was summarised in writing on the bedside whiteboard.

In addition to bedside rounds, our physician rounding protocol required that each physician participates in a preround huddle (9:00-9:15 hours) and afternoon huddle (15;00 hours) with their case manager to review the discharge needs and potential disposition for each patient including the expected date of discharge.

Physicians and nurses who underwent simple verbal training prior to our behavioural interventions and performance monitoring revealed poor adherence (30% range). Behavioural scientists were recruited to design interventions that would encourage more faithful adoption of the rounding system.[37] Prior to the intervention, we interviewed both high and low performing physicians and nurses to determine how to best address their concerns during our training sessions in order to maximise adherence. The first intervention consisted of an email reminder the day prior to each rotation from the Director of Patient Care, Quality, and Safety and senior author (FSS) describing in detail the rounding protocol. This was accompanied by a brief training session on the TEMP checklist for nurses conducted by the unit's nurse clinical leader.

These interventions were supplemented by a 10 min huddle on the unit with physicians and nurses each Friday. The discussion leader encouraged the nurses to share their positive experiences with the physicians and in nearly every gathering they emphasised the benefit of clearly understanding the plan for the day. Several nurses also reported that the checklist uncovered oversights and prevented potential errors. These comments were well received by the physicians who reported that the nurses' comments encouraged them to adhere to TEMP. Physicians were also asked to share their positive impressions and many reported that they were no longer paged about management plans because this information was covered during bedside rounds. The first intervention, which continued for 2.5 months, was followed by a second intervention (started on 5 October 2019 unit 1 and 24 October 2019 for unit 2).

During the second intervention, physicians and nurses were provided with immediate feedback after daily rounds consisting of their percentage adherence and a description of what elements could be improved. This feedback was followed by the research team sending the unit nurse manager a weekly email that included graphs of daily adherence scores over 7 days and suggested a target for the next week. Physicians reported this feedback was helpful and motivated adherence to the TEMP protocol.

Adherence before intervention averaged 38.6% in unit 1 and 32.8% in unit 2 (). During the first intervention, adherence improved to 63.5% in unit 1 and to 59.5% in unit 2. Further improvement to 69.5% in unit 1 and 76.8% in unit 2 was observed following intervention 2. For a more detailed description of the adherence intervention, see Gravina *et al*.[37]

Study design

An ABC repeated-measures multiple-baseline design across two units was used to evaluate this intervention's impact on patient safety, hospital length of stay and readmission rate, and patient satisfaction.

Setting

This prospective trial was conducted on two 36-bed general in-patient adult hospitalist units in an academic hospital. Bed occupancy ranged from 90% to 95% full during the study. Each unit was staffed with eight bedside nurses, a charge nurse, a nurse manager and two physicians. The physicians rotated on and off for 7 days at a time and changed every 4–6 weeks. The nurses changed every 3 days.

Data sources, inclusion criteria, analysis

All data were obtained from the hospital electronic medical record accessed by a member of the Quality Improvement Department (RC). Mail in patient satisfaction surveys was conducted by Press-Ganey through mail in questionnaires.

Inclusion criteria and analysis: The data were then exported to Excel. To remove any LOS time that was not specifically attributed to units 1 and 2, a calculated field for LOS strictly was created using total LOS in hours and percentage of days on the last floor using the formula

$$LOS_{floor} = \frac{(\%\ Days\ on\ Last\ Floor * LOS_{total})}{100}$$

This allowed meaningful comparison of patients on the two units before and after intervention 1 and intervention 2.

Patients were excluded if their stays crossed over any period or phase of the study (baseline, intervention 1, intervention 2) as were patients assigned to physicians who were not members of the hospitalist division because these physicians were not applying the bedside rounding protocol. Further exclusions included patients who had a duration of stay of <24 hours, patients who had expired, as well as those discharged to long-term care. After applying these filters, 75% of total records were included in the analysis (see online supplemental table S1).

Minitab V.16 software, and R V.4.0.3 were used in the data analysis and included analysis of variance (ANOVA), χ^2, t test, Tukey's analysis and regression analysis.

RESULTS

The sample included 56.2 % patients with Medicare, 16.5% Medicaid, 16.2% Commercial and 11.1% self-pay. 68.6% of patients were discharged home with an additional

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Table 1 Length of hospital stay and percentage adherence

Overall	Hours mean±SD hour (N)	ANOVA	Tukey	% Adherence[37] mean±SD	SMA[37]
Baseline	105.0±99.3 (729)			35.8±18.1	
Int 1	99.3±86.1 (739)		P=0.4270	62.7±15.1	
Int 2	91.8±78.8 (545)		P=0.0212	71.9±14.2	
		P=0.0290			
Unit1					
Baseline	100.8±93.3 (305)			38.6±16.1	
Int 1	101.2±88.7 (382)		P=0.9980	63.5±15.3	P=0.0064
Int 2	96.4±85.9 (326)		P=0.8165	69.5±14.9	P=0.0018
		P=0.7500			
Unit 2					
Baseline	108.0±93.8 (424)			32.8±19.1	
Int 1	97.4±83.4 (357)		P=0.1869	59.5±15.4	P=0.0020
Int 2	85.0±66.4 (219)		P=0.0033	76.8±10.7	P=0.0024
		P=0.0044			

ANOVA, analysis of variance ; SMA, Simulated Model Analysis.

13% discharged to homecare. 11.4% were discharged to skilled nursing facilities. Each unit had similar payer mix and discharge type.

First, we examined hospital acquired infection rates before and after our interventions. CLABSI and CAUTI occurrences in both units combined accounted for 3.57% of all hospital-wide occurrences up until the first week of the intervention 1 phase. Following the first week of intervention, no occurrences of CLAUBI and CAUTI were observed for either unit during the remaining period of the study.

Next, we examined the effects of our interventions on hospital lengths of stay. The effect of the two interventions was assessed by applying three one-way ANOVA for the combined units and the individual units in consideration of the unbalanced design of the study (table 1). The overall data set showed a statistically significant difference in length of stay of 13. 2 hours with a p value of 0.0290 by ANOVA. Tukey's test was performed post hoc to determine the significance between group means. Differences in the mean between baseline and intervention 1 (5.7 hours or 5.38% difference), and between intervention 1 and intervention 2 (7.5 hours or 7.53% difference), were not statistically significant. However, a statistically significant difference between the baseline and intervention 2 was observed (13.2 hours or 12.5% difference, p=0.0212).

Individually, unit 2 showed the same effect as the combined analysis with a p value of 0.0044. Baseline and intervention 2 were shown to be significantly different by Tukey's test (23 hours or 21.29% difference, p=0.0033) (table 1). Unit 1 did not show a significant difference in the mean LOS in the three- phase analysis (p=0.750) or by individual comparison of baseline to intervention 2 (4.4 hours or 4.36% reduction, p=0.8165).

Monitoring of length of stay over time showed a shift below the median following intervention 2 for unit 1 as well as a shift following both interventions 1 and 2 for unit 2. Process variation decreased through the three phases of the study in both units (figure 2A).

Regression analysis revealed a strong correlation between adherence to the checklist and bedside rounding system, and the magnitude of the length of stay reduction: R^2=69%, p=0.0410 (figure 2B).

Readmission rates were also assessed before and during the interventions. Thirty-day readmission rate steadily decreased on unit 1 following the two interventions dropping from 22% to 18% during the intervention period and continued to decline following the completion of the study phase decreasing to a low of 11% (figure 2C). Similarly unit 2 demonstrated a progressive reduction in 30-day readmission rate dropping from 20% to 10%. These differences did not achieve statistical significance by t-test p=0.1398. However, the wide swings in readmission rates quickly stabilised following our interventions indicating improvements in the reliability of the discharge process and improvement in the clinical stability of discharged patients. Following intervention 2 readmission rates demonstrated a consistent downward trend.

Patient satisfaction was assessed using a 4-point Likert scale (1 never, 2 sometimes, 3 usually, 4 always) and analysed using ANOVA for intervention effects, and χ^2 comparing always versus never responses at baseline and following interventions 1 and 2 (table 2). Although overall mean satisfaction scores for communication with the MD modestly improved from baseline for both intervention 1 and 2, these differences were not statistically significant by either assessment (ANOVA p=0.405, χ^2=0.362). The percentage of patients who checked

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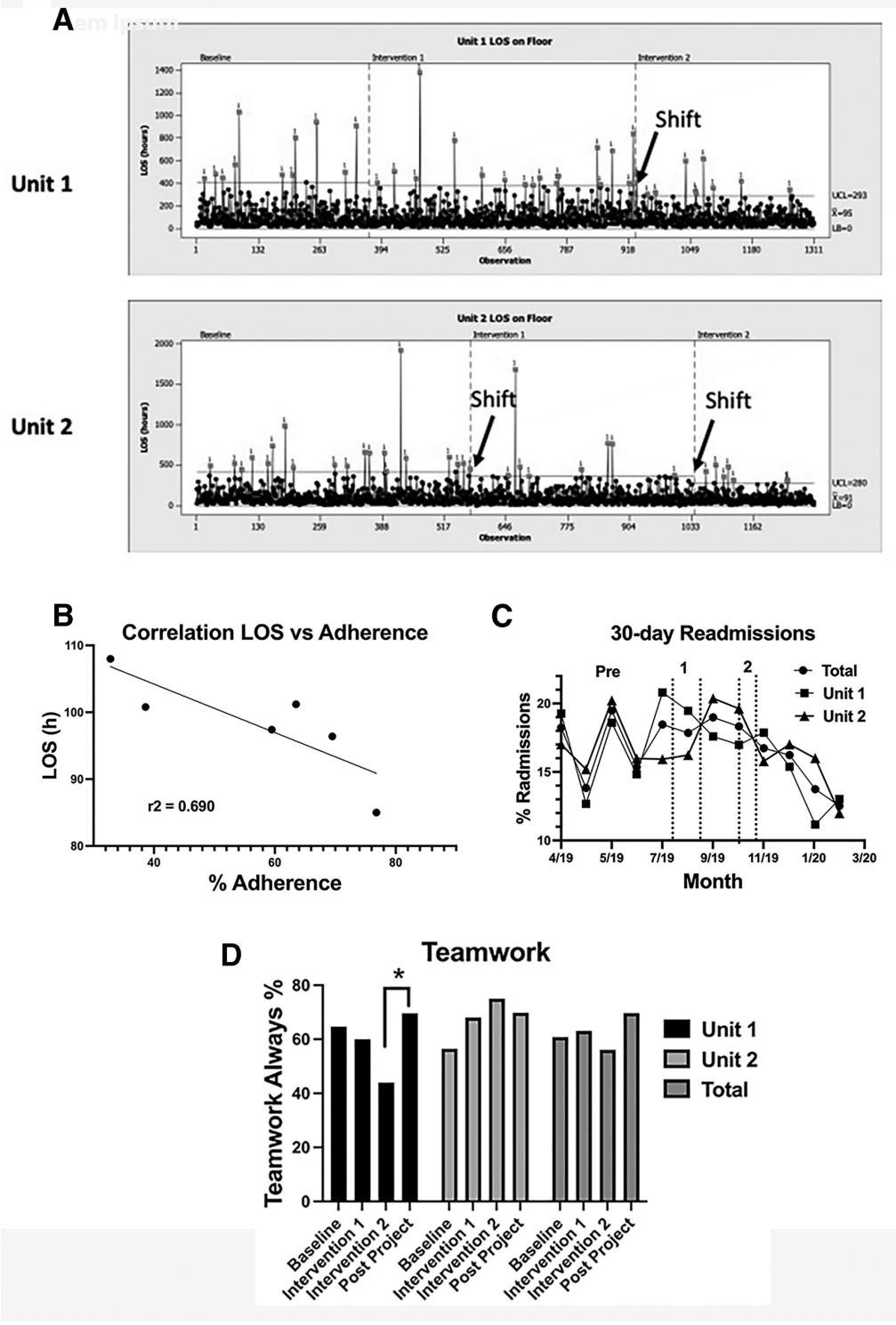

Figure 2 (A) Hospital Length of stay (LOS) over time. Each individual LO) in hours was plotted as a line with a filled circle near the top on the day of discharge. The median length of stay is plotted as a horizontal solid line and was determined for each experimental period separated by a vertical dashed line: baseline, intervention 1 and intervention 2. Unit 1 change in LOS over time. There is a significant decrease in median LOS after intervention 2 shown by the arrow and labelled shift. Unit 2 change in LOS over time. There is a significant decrease in the median LOS following both intervention 1 and 2, shown by the arrows and called shifts. Note the reduction in variability of LOS over time. (B) Correlation between LOS and adherence. LOS in hours was plotted in the y-axis and adherence % on the x-axis. Correlation coefficient = 0.69. (C) 30-day readmission percentages over time. Unit 1 readmission percentage each month before (pre), after Intervention 1 (first dashed line on the left), and after intervention 2 (third dashed line). Unit 2 readmission percentage each month before (pre, after intervention 1 (second dashed line) and after intervention 2 (fourth dashed line). (D) Patient perceptions of teamwork before, after intervention 1, intervention 2 and 2 months after intervention 2. Asterisk marks the only statistically significant difference by χ^2 p=0.0352. Respondents varied from N=16 to 51.

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Table 2 Patientsatisfaction survey (1 never, 4 always)

Question	Mean±SD (N)	ANOVA	χ^2
Physician communication			
Baseline	3.49±0.81 (235)		
Intervention 1	3.52±0.79 (152)		
Intervention 2	3.61±0.65 (106)		
		P=0.405	P=0.362
Nursing communication			
Baseline	3.55±0.71 (235)		
Intervention 1	3.53±0.74 (152)		
Intervention 2	3.66±0.61 (107)		
		P=0.290	P=0.328

ANOVA, analysis of variance .

doctors always communicated with them increased from 65.11% to 67.11% after intervention 1 and to 69.81% following Intervention 2. Communication with nursing also trended upward after the second intervention; however, these changes did not achieve statistical significance (ANOVA p=0.29, χ^2 p=0.328). Patients' perceptions of teamwork between nurses and physicians were also assessed (figure 2D). The percentage who answered always with regard to nurses and doctors worked together in managing their care increased from 60.8 to 63.1% following intervention 1, but dropped 56.1% following intervention 2; however, following the completion of the study increased to 69.7%. The lower overall perception of teamwork following intervention two was the result of evaluations of patients on unit 1 where the always percentage dropped from a 64% to 44% immediately following intervention two but subsequently rebounded to 69%. Unit 2 had higher adherence rates to the checklist and rounding protocols and their higher adherence was accompanied by moderate improvements in patients' assessment of teamwork for both interventions increasing from a 56% baseline to 68% following intervention 1 and to 75% following intervention 2. The only statistically significant improvement was seen for unit 1 where a significant rise in perceptions of teamwork was observed 2 months after intervention 2, the percentage of patients reporting always witnessing teamwork increasing from 44% to 69%, p=0.0352.

DISCUSSION

Summary of our findings

Standardised protocols can improve the safety and reliability of healthcare, and this approach has the potential added dividend of improving productivity by improving efficiency. We combined a standardised nursing communication checklist with standardised interprofessional bedside rounds to achieve these goals as well as to improve patient satisfaction.

Within 1 week of implementing these protocols, central line blood stream infection and catheter associated urinary tract infections were eliminated and not a single episode was documented after the first week of implementation.

By assuring a proper diet, encouraging exercise and regular bowel movements as well as regular sleep, we expected to speed patient recovery. Facilitating the coordination of care with nurses by sharing the plan for the day as well as reducing nursing workload by reducing the frequency of vital signs were also expected to contribute to a shortened length of stay, and a statistically significant decrease in LOS was achieved in both medical-surgical units.

The reduction in length of stay was accompanied by a simultaneous decrease the readmission rate reflecting improved reliability and was likely the result of the inclusion of a 9:00 as well as 15:00 hours daily huddles between the case manager and physician.

The impact on patient satisfaction trended towards improvement with regards to doctor–patient and nurse–patient communication as did patient perception that doctors and nurses were working together to manage their illnesses.

Strengths of our study

There are several strengths of our study. First, the staggered implementation design allowed us to learn from our first implementation to improve our training methods for the second unit. Second, the close monitoring of adherence combined with our training methods yielded higher percentage of participants applying our standardised protocols. Third, our standardised protocols established a setting that assured more effective communication between patients, nurses and physicians. The strong correlation between adherence to the protocols and reductions in length of stay emphasises the importance of monitoring performance and utilising a bundle of educational approaches to achieve effective adherence. Too often quality improvement projects assume that those assigned to carry out the improved protocols will apply them faithfully. In the absence of training adherence to our protocols only achieved levels in the mid-30% range. Despite a training session, weekly feedback huddles and weekly emails adherence only improved to 50%–60% range, and it was only after providing timely feedback consisting of adherence scores did unit 2 achieve adherence percentages in the mid 70% range.[37]

Comparison with prior studies

Previous studies combining checklists and interprofessional rounds have had variable success.[5 11 19 21 38–43] Concerning reductions in nosocomial infections, no changes in infection rates were previously reported. However, other safety outcomes have been observed, including reductions in mortality,[19 21] and reduced numbers of falls in a geriatric hospital ward.[39] One of the most frequently reported benefits has been improved communication and coordination

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of care.[5 38 40–43] Although not formally documented in our study, comments from many of our physicians and nurses attest to improvements in both of these parameters when TEMP was combined with standardised bedside rounds. In two reports, LOS was reduced as we observed,[11 19] and in one study shortened LOS was accompanied by a reduction in 30-day readmissions.[11]

Impact on people and systems

We observed that performance measures for unit 2 consistently exceeded those of unit 1. We suspect this difference in performance was due to improvements in our training in the second unit. The nurse manager for unit 2 became highly invested once she began receiving the graphic feedback. Adaptive change is well known to be associated with emotional disequilibrium[44] and during our unstructured interviews several physicians expressed a sense of loss because they were no longer allowed to round on their own early in the morning at a time when they did not have to 'waste time' communicating with the nurses. Despite the perception that the standardised protocol would extend the duration of rounds, average rounding times before and after the interventions were not significantly different and consistently took less than 6 min per patient.[37]

Limitations

A limitation of this study is that it is a single institution with a limited sample size. Second other potential outcomes from our intervention were not measured, including improvements in patient physical activity, reductions in telemetry use, reductions in laboratory tests and improvement in pain control. Future studies should be performed to also measure these outcomes. In addition, this study was performed before the COVID-19 pandemic, and the COVID-19 pandemic had a major impact on bedside interdisciplinary rounds. To reduce exposure to SARS-CoV-2 bedside rounds were switched to 'table rounds'. With the loss of bedside rounds and discontinuation of the TEMP checklist the incidence of CLABSI increased from 0 to 1.74 infections per 1000 days in unit 1 and from 0 to 2.93 per 1000 days in unit 2 (June 2020–June 2021). During this same period, no CAUTI infections were reported in either unit. As we return to normal clinical operations, we are now reinstating bedside interdisciplinary rounds and the TEMP checklist.

CONCLUSIONS

This simple mnemonic serves as verbal and mental multipurpose checklist for bedside rounds, assuring that all the key components for nursing care are reliably addressed on work rounds. Our standardised communication protocol encourages bedside nurses and patients to actively participate in work rounds. Our study shows that adherence to this bedside checklist and enhanced communication during rounds results in improved outcomes with regard to reduced hospital-acquired infections, LOS and readmission rate and has the potential to improve patient satisfaction. We share our mnemonic in the hopes that other institutions will join us in implementing and studying the impact of TEMP within their different hospital settings because we believe that this simple mnemonic has the potential to significantly improve the quality and safety of patient care.

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