A Randomized Field Study of a Leadership WalkRoundsTM-Based Intervention

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ABSTRACT

Background: Leadership WalkRounds™ have been widely adopted as a technique for improving patient safety and safety climate. WalkRounds™ involve senior managers directly observing frontline work and soliciting employees' ideas about improvement opportunities. However, the hypothesized link between WalkRounds™-based programs and performance has not been rigorously examined in a set of randomly selected hospitals.

Objective: To fill this research gap, we conducted a randomized field study of a WalkRounds™-based program.

Research Design: Fifty-six work areas from 19 randomly selected hospitals agreed to implement an 18-month long WalkRounds™-based program to improve safety. We compared their results to 138 work areas in 48 randomly selected control hospitals.

Participants: We conducted the program in four types of clinical work areas: operating rooms/post-anesthesia care units; emergency departments, intensive care units, and medical/surgical units. We collected survey data from nurses in those work areas.

Measures: To measure the program's impact, we collected pre and post survey data on perceptions of improvement in performance (PIP)—a proxy for quality and an important organizational climate antecedent for positive, discretionary behaviors of frontline staff. We compare change in PIP in the treatment work areas to the same type of work areas in control hospitals.

Results: On average, compared to control work areas, our WalkRounds™-based program was associated with a statistically significant decrease in PIP of .17 on a 5-point scale (4.5%).

Conclusions: Our study calls into question the general effectiveness of WalkRounds™ on employees' perceptions, which had been assumed in prior literature.

Key Words: quality improvement, patient safety, culture, implementation research

INTRODUCTION

Hospitals face an imperative to improve quality, increase efficiency, and improve customer experience.[1] Many hospitals utilize process improvement techniques to achieve these goals. Unfortunately, change efforts often fail,[2-5] typically from a lack of senior management involvement. However, there is little evidence-based advice about how senior managers can most effectively participate in process improvement efforts.[6]

One technique to involve senior managers is a program of visiting the organization's frontlines to observe and talk with employees while they do their work. The intention is that managers and frontline staff will work together to identify and resolve obstacles to efficiency, quality or safety.[7-9] This technique was originally referred to as "Management-By-Walking-Around."[9] It has been adopted in many settings including semiconductor manufacturing,[8] schools[10] and hospitals.[2 3 11] In hospitals it is most commonly known as Leadership WalkRounds™[7] and for brevity, we will refer to it as WalkRounds.™ The program is theorized to improve patient safety through two levers. First, it is a visible sign of managers' commitment through the solicitation of employee opinions. Visible commitment motivates employee engagement in discretionary quality improvement efforts.[8 12] Second, improvement occurs when frontline employees identify safety concerns and managers help remove them.[7 13]

WalkRounds™ can have a positive impact on climate. At one hospital, nurses who participated in visits from senior managers reported higher perceptions of safety climate after the visit than nurses who worked on control units.[14] Another study of seven hospitals that implemented the program from 2002 to 2005 found that in the two hospitals that sustained the program, frontline care providers' perceptions of safety climate improved compared to their pre-intervention scores.[15]

However, the evidence supporting WalkRounds™-based programs is limited. The above-mentioned study did not test the effect of the aborted programs on the five non-compliant hospitals. Lacking control hospitals, it also did not test the alternate explanation that improvement at the two successful hospitals stemmed from time-related factors, such as industry-wide developments in technology or knowledge. An unrelated study of UK hospitals suggests this alternate explanation is a distinct possibility. Comparing intervention hospitals to controls, Benning and colleagues found that a broad quality improvement program with a WalkRounds™-based component yielded little to no improvement on a wide variety of objective and subjective performance measures.[2 3] To our knowledge, no studies have tested the efficacy of a WalkRounds™-based program on randomly selected organizations, which would shed insight into the program's generalizability beyond those organizations where senior managers champion the idea.

Despite the limited evidence base, many leading healthcare organizations recommend WalkRounds.™ For example, the Institute for Healthcare Improvement,[16] Agency for Healthcare Research and Quality, and Health Research and Educational Trust in partnership with the American Hospital Association have supported implementation of similar programs. In the UK, the National Health System and the Scottish Patient Safety Programme advocate forms of WalkRounds™, and at least 79 hospitals have implemented a formal WalkRounds™-based program.[17]

This paper presents results from a field study that tested the effectiveness of a safety improvement program inspired by WalkRounds.™ We compare pre and post measures of perceived improvement in performance (PIP) from work areas in hospitals that were randomly selected to implement the program with pre and post measures from the same types of work

areas in control hospitals. Such rigorous testing of the effectiveness of process improvement interventions is rare.[18] Furthermore, unlike other studies whose interventions incorporated multiple improvement techniques,[2 3] our study focused solely on the WalkRounds™-based program, which enabled us to evaluate its effectiveness more cleanly. Contrary to our expectations, we found that the WalkRounds™-based program was associated with decreased PIP.

METHODS

Study Setting and WalkRounds™-Based Intervention

Our study employed a quasi-experimental design, including a pre-test and post-test of work areas in treatment and control hospitals. We randomly selected 92 U.S. acute-care hospitals, stratified by size and geographic region, to participate in a survey of patient safety climate. No financial incentives were provided; however, participation fulfilled a national accreditation requirement. At enrollment all hospitals were aware that they might be invited to participate in a program involving senior managers to improve patient safety, but details regarding the program were withheld to prevent contamination of control hospitals. To select hospitals to participate in the WalkRounds™-based program, we drew a second, stratified, random sample of 24 hospitals from the sample of 92. The remaining 68 not selected for the program were "control hospitals." The program began in January 2005 and lasted 18 months.

Drawing on prior research,[13-15] the program consisted of repeated cycles of senior manager-staff interaction, debriefing, and follow up. Senior managers, such as the Chief Executive, Operating, Medical, and Nursing Officers (CEO, COO, CMO, and CNO, respectively), interacted with frontline staff to generate, select, and address improvement ideas. Their

interactions took two forms: visits to the organizations' frontlines to observe work, which we called "work system visits"; and special meetings, called "safety forums," with larger groups of staff to discuss safety concerns. The two activities were conducted in the same work area, such as the emergency department. In work system visits, four senior managers would each spend 30 minutes to two hours visiting a particular work area to observe a person working. The senior managers would each observe a different process, such as medication administration, or person, such as a nurse or physician, to develop cross-disciplinary insight into the work done in the area. The purpose was to build senior managers' understanding of the frontline work context and gather real-time, grounded information about safety problems.[15] In addition to the visits, managers were instructed to facilitate a safety forum in the work area. Safety forums were designed to enable a larger group of frontline workers from the work area to tell senior managers about their safety concerns and "points-of-pride".[19] By supplementing work system visits with safety forums, the program addressed research suggesting that interaction with more frontline staff increases WalkRounds™'s positive impact.[14] The program continued with a "debrief meeting," which organized the information collected from the visits and forum. Senior managers attended, as did work area managers, selected frontline workers, and the hospital's patient safety officer. They compiled the improvement ideas identified, discussed and prioritized them, and decided next steps, ranging from doing nothing to suggesting solutions and assigning responsibility. Managers were encouraged to communicate with staff about implementation efforts, describing what changes, if any, were made in response to identified ideas. Patient safety officers entered the ideas generated and actions taken into an electronic spreadsheet and sent this spreadsheet to our research team for analysis.

Each round of activities constituted one cycle. Each cycle focused on one clinical work area and took approximately three months to complete, which is comparable to the time reportedly required for improvement teams to solve problems.[13 20] After completing a cycle, the management team would repeat the activities in a different work area. The program focused on four work areas: operating room or post anesthesia care unit (OR/PACU), intensive care unit (ICU), emergency department (ED), and medical or surgical ward (Med/Surg). Senior management teams were able to customize the order in which they conducted the program. Cycles continued over the 18-month implementation. On average, hospitals conducted cycles in 4 work areas and only one cycle in each work area.

We use data from the four work areas targeted by the WalkRounds™-based program in the control hospitals and the treatment work areas to test the effectiveness of the program. Specifically, survey data on PIP were collected before implementation of program activities (2004) and again after the program was completed (2006). At each hospital, we surveyed a random 10% sample of frontline workers, with additional oversampling in OR/PACUs, EDs, and ICUs in 2006 to improve sample size. The baseline (2004) response rate was 52%; the follow-up (2006) response rate was 39%. For the analyses in this paper, we used data from registered or licensed vocational nurses (n=1,117 in 2004 and n=903 in 2006).

Twenty of the 24 treatment hospitals completed the improvement program in at least two work areas. The four that did not complete the treatment dropped out because one went out of business, one was purchased by another organization, and two experienced significant senior management turnover. As a result, they did not provide data on ideas generated, selection, actions taken, and feedback provided to frontline workers, or the posttest survey. We thus excluded these hospitals from our analysis. Another treatment hospital had missing data for our

control variable for financial stress and was dropped from the analysis. There was no difference in PIP in 2004 between work areas from the five treatment hospitals that were dropped and the work areas from the 19 treatment hospitals that were retained (t= -.66, NS). Forty-eight of the original 68 control hospitals completed the posttest survey in 2006, making an initial total sample of 67 (19 treatment + 48 control) hospitals. There was no difference on 2004 survey measures between work areas from the control hospitals that dropped out of the 2006 survey and work areas from the control hospitals that were retained (t=1.1366, NS). There was also no difference in 2004 PIP between the four treatment work areas in treatment hospitals and the same four work areas in the control hospitals (t= -.15, NS).

Measures

The variable, "Treatment," indicated whether the work area had received the WalkRounds™-based treatment (1=yes) or was a work area from a control hospital (0=no). Non-WalkRounds™ work areas within treatment hospitals were not included in the analysis to prevent contamination. We created two variables to measure implementation of the program[21]: whether there was a work system visit in the work area (1=yes, 0=no), and whether there was a safety forum in the work area (1=yes, 0=no). We also gathered data on whether the senior managers participated in these two activities.

Our dependent variable, PIP, was derived from four survey items: "The quality of services I help provide is currently the best it has ever been;" "We are getting fewer complaints about our work;" "Overall, the level of patient safety at this facility is improving;" and "The overall quality of service at this facility is improving." Using a 5-point Likert response scale ranging from 1=strongly disagree to 5=strongly agree, respondents were asked the extent to which they agreed

with the items. Agreement with these items indicated that respondents thought safety and quality performance were improving. The scale exhibited high reliability, with a Cronbach's alpha of .85 for the combined 2004 and 2006 individual-level, nurses-only data set[22] (n=2990).

We calculated intraclass correlations (ICC) and mean interrater agreement score (r_{WG}) to test whether work area-level aggregation of PIP was appropriate. Significant intraclass correlations (ICC[1]=.06, F=5.69, p-value< .000, and ICC[2]=.82) supported aggregation[23]. The r_{WG} for nurses' rating of PIP was 0.60, which also was sufficient for aggregation.[24] For each nurse, we calculated the mean for the four items. We then calculated the 2004 mean PIP for each work area by averaging the 2004 mean scores of the nurses in that work area. We repeated this process using the 2006 data to generate 2006 mean PIP scores.

We created two different outcome variables to measure improvement in PIP. First, we used the 2006 mean PIP score for the work area as the dependent variable and included the 2004 mean PIP score for the work area as an independent variable, which allowed comparison of change in PIP for work areas with the same initial score.[25] Our second outcome measure was "change in PIP" which was calculated by subtracting a work area's 2004 mean score from its 2006 mean score. In this case, to account for the greater opportunity to achieve improvement in PIP among work areas with a low PIP in 2004, we paired this variable with a control variable, "Bottom quartile PIP 2004," which was coded as a "1" for the bottom quartile of work areas in PIP in 2004 and a "0" for all others.

We used a perceptual measure of performance, *perceived improvement in performance (PIP)*, because WalkRounds™ have been shown to impact organizational climate.[3 14] Organizational climate is an important driver of performance and one which requires perceptual measures.[3] Perceptions of climate are also an important outcome in their own right because they

influence employee behaviors, which in turn result in higher objective performance.[26] Research has also found that nurses' perceptions of safety climate are associated with actual safety outcomes, such as mortality, infections, readmissions, and other objective performance outcomes, such as length of stay.[27-31] Pragmatically, the use of a perceptual measure was necessary as the hospitals were unwilling to share confidential data about safety incidents with us.

Control variables included major teaching hospital (1=yes, 0=no); Dun & Bradstreet's measure of the hospital's financial stress in 2004, with higher numbers indicating a higher likelihood that the business will seek legal relief from creditors or cease operations without paying creditors in full over the next 12 months; a set of dummy variables for the number of hospital beds (reference group=<100 beds; medium=100-250 beds; large=>250 beds); a set of dummy variables for type of work area (reference group=Med/Surg; OR/PACU; ICU; ED). Data on hospital characteristics came from the 2004 American Hospital Association Annual Survey of Hospitals. Other control variables, such as non-profit status (1=non-profit; 0=otherwise) and geographic region were not significant in any models and were therefore excluded from analyses.

Statistical Techniques

We used Stata 11.1™ to test the effectiveness of our WalkRounds™-based intervention. We used linear regression with robust standard errors, clustered by hospital.[32] We used our two different outcome variables to measure improvement in PIP, given controversy regarding the most appropriate way to test for changes over time across groups.[25] In both models, we used the four clinical work areas targeted by the program which resulted in a sample size of 56 treatment and 138 control work areas.

First, in an analysis of covariance,[25] we predicted 2006 PIP for work area *i* using the following equation:

$$PIP\ 2006_i = \beta_0 + \beta_1 PIP2004_i + \beta_2 Treatment_i + X\beta + \varepsilon_i \quad (1)$$

The parameter of interest is β_2, which will be positive if the WalkRounds™-based treatment was associated with an increase in PIP in 2006. β_1 documents the effect of the baseline measure on the posttest. X denotes a vector of control variables (teaching hospital, financial stability, a set of dummies for hospital size, and a set of dummies for type of work area) and β is a vector of parameters for the control variables. This analysis of covariance answers the question, "Is the expected change in PIP the same across treatment and control work areas, when we compare work areas that had the same initial score?"[25] This approach reduces concern about the potential that significant results are driven by regression to the mean. It is appropriate for our data because the observation units were assigned to the treatment or control conditions at random and the population distributions of the pre-treatment scores were equal, even though the sample means of the initial scores differed slightly across groups.[25 33]

Second, using regression we examine the change in PIP for work area *i* using the following equation:

$$Change\ in\ PIP_i = \beta_0 + \beta_1 Bottom\ Quartile\ 2004\ PIP_i + \beta_2 Treatment_i + X\beta + \varepsilon_i \quad (2)$$

The parameter of interest is again β_2, which will be positive if the WalkRounds™-based treatment was associated with a positive change in PIP. β_1 documents the effect on change in PIP of being among the hospitals with the lowest PIP in 2004. X denotes the same vector of control variables as specified in equation (1) and β is a vector of parameters for the control

variables. This approach answers the question, "Are the average change scores for the treatment and control work areas different?"[25] While this approach does not control for baseline differences in PIP, the inclusion of Bottom quartile in PIP 2004 provides a rough adjustment. This method has intuitive appeal as it measures the difference in PIP directly.

We also tested the effect of conducting specific WalkRounds™-based program activities. In separate regressions, instead of a treatment variable, we included the dichotomous variables representing whether a work system visit was conducted and whether a safety forum was conducted. The variables documenting whether senior managers participated in these activities were similar because the senior managers were almost always present.

RESULTS

Mean PIP in the 56 treatment work areas was 3.78 in 2004 and 3.69 in 2006. The difference of -.09 between 2004 and 2006 is not statistically significant at the $p<.10$ level. The same four types of work areas (n=138) in control hospitals had a mean PIP of 3.8 in both 2004 and 2006.

The treatment work areas implemented the WalkRounds™-based program activities as evidenced by the following statistics. Ninety-one percent had a work system visit; 80% had senior manager participation in the visit; 50% conducted a safety forum; 42% had senior manager participation in the forum. On average, work areas identified 19 problems and took action on 11. Table 1 shows descriptive statistics for our main variables.

Table 1

The analysis of covariance regression results shown in Model 1 in Table 2 compares the four types of clinical work areas that received the WalkRounds™-based intervention in the treatment hospitals to the same types of work areas in the control hospitals. The coefficient for treatment was marginally significant and negative. The program was associated with a -.15 point decrease in PIP when compared to work areas that did not participate in the program, controlling for the pre (2004) PIP score.

A possible explanation for the negative impact of the WalkRounds™-based program is that some treatment work areas failed to conduct the recommended activities.[21] Our second regression thus controlled for the implementation fidelity to test this possibility. Results shown in Table 1, Model 2 suggest that the negative impact of the program is not due to failure to implement the program. In fact, conducting work system visits had a marginally significant, negative impact on 2006 PIP.

Models 3 and 4 show similar magnitude of results for the change score analyses. However, the coefficients for treatment and work system visit are significant at the $p<.05$ level. Thus, we conclude that this particular WalkRounds™-based program decreased nurse's PIP by approximately 4.5% (Coefficient for treatment effect of -.17/Mean 2004 PIP of 3.78).

Table 2

DISCUSSION

This paper investigated the effectiveness of a particular type of WalkRounds™-based program that has been widely deployed by hospitals. We found evidence that participating in this particular program decreased PIP on average. The magnitude of the decrease in our sample

is more than the -.07 decrease in a five-point organizational climate scale experienced by treatment hospitals in Benning et al.'s (2011) study of nine hospitals (2011). This is an important result because many hospitals throughout the U.S. and U.K. have implemented similar programs under the assumption that WalkRounds™ will improve organizational climate. Our study provides a cautionary tale that visits by senior managers to the frontlines of the organization will not necessarily increase staffs' perceptions of performance improvement. Failure to achieve gains through improvement programs, such as WalkRounds™-based programs, could be contributing to the stagnant levels of safety climate and adverse events.[34]

Our study illuminates the negative repercussions that can arise if hospitals leaders attempt, but fail to engage meaningfully with frontline staff. We suspect that, as with incident reporting systems,[35] negative consequences arise from improvement programs that solicit, but do not sufficiently address, frontline staffs' concerns. Failure to meet expectations, once raised, can negatively impact organizational climate. Unless such programs are implemented with authentic motivation to identify and resolve issues, they may yield a negative return on the money invested.

Prior research has found that for some hospitals, WalkRounds™ were associated with a positive impact on organizational climate.[3 14 15] We observed variability among the work areas with regards to change in PIP, with some showing marked improvement. Thus, we believe that it is possible, as Frankel and colleagues assert,[15] that organizations with committed senior managers who have a positive outlook and who invest sufficient time to the program may reap positive results. Future research should probe the specific conditions under which senior management involvement with frontline staff produces positive organizational change.[36]

Our findings must be considered in light of study limitations. First, our small sample size limited our analysis. Given the cost and time intensive nature of conducting an experiment with hospitals over an 18-month period, it is difficult to conduct field-based, interventional experiments with samples larger than 20 to 30 organizations. Furthermore, some work areas were dropped from our analysis due to missing data in either 2004 or 2006. A second limitation is the perceptual measure of improvement. However, for reasons detailed above, a perceptual measure is an important indicator of the impact of the intervention we tested. Furthermore, prior research that included a WalkRounds™-based intervention did not find links between multiple clinical outcomes and the intervention,[2 3] corroborating our study results.

Understanding the impact of WalkRounds™-based process improvement programs is helpful for organizations that may be considering implementing these techniques. Our study suggests that such programs may fail to change employees' perceptions when implemented in the average hospital.

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Table 1. Mean, Standard Deviation (SD), and Correlations for Work Areas that had the WalkRounds™ intervention. (N=56 work areas)

	Variable	Mean	SD	Min	Max	1	2	3	4	5
1	2006 PIP	3.69	.61	1.92	5.00					
2	Change in PIP	-0.09	0.67	-2.25	1.33	.639*				
3	Had work system visit	91%	29%	0	1	-.195	-.197			
4	Number of work system visits in area	3.41	3.16	0	12	.055	-.1	.342*		
5	Had safety forum	50%	50%	0	1	.056	.028	-.313*	.097	
6	Percent of problems addressed	62%	31%	0	1	-.088	.079	.083	.043	-.074

* $p<0.05$

Table 2. Regression equation comparing 2006 PIP and change in PIP by staff nurses in treatment work areas (OR/PACU, ICU, ED, and Medical/Surgical) versus the same types of work areas from control hospitals, clustered by hospital with robust standard errors in parenthesis (n=56 treatment work areas and 138 control work areas)

	Model 1	**Model 2**	**Model 3**	**Model 4**
Outcome variable	2006 PIP	2006 PIP	Change in PIP	Change in PIP
2004 PIP	.19** (.06)	.19** (.06)	Not in model	Not in model
Bottom Quartile 2004 PIP	Not in model	Not in model	.75*** (.10)	.76*** (.11)
Major teaching hospital (1=yes)	.22 (.14)	.22 (.14)	.21^ (.13)	.22 (.13)
Financial stress 2004	.003^ (.002)	.00 (.00)	.00 (.00)	.00 (.00)
Medium size hospital (100-250 beds)	-.30** (.09)	-.31** (.1)	-.43* (.10)	-.44*** (.10)
Large size hospital (>250 beds) (1=yes)	-.24* (.11)	-.25* (.11)	-.26* (.12)	-.27* (.12)
OR/PACU (1=yes)	.07 (.09)	.06 (.09)	-.08 (.11)	-.09 (.11)
ICU (1=yes)	.01 (.10)	.01 (.10)	.00 (.13)	.00 (.13)
ED (1=yes)	-.11 (.10)	-.11 (.10)	-.15 (.13)	-.15 (.13)
Treatment work area (1=yes; 0 = control)	-.15^ (.08)	Not in model	-.17* (.08)	Not in model
Was a work system visit conducted?	Not in model	-.20^ (.12)	Not in model	-.23* (.11)
Was a safety forum conducted?	Not in model	.04 (.11)	Not in model	.01 (.11)
Constant	3.02*** (.23)	3.03*** (.24)	-.02 (.20)	-.00 (.21)
Observations	194	194	194	194
Treatment & control work areas	56 & 138	56 & 138	56 & 138	56 & 138
Degrees of freedom	F(9,55)	F(9,55)	F(9,55)	F(10,55)
F statistic	5.34***	5.05***	9.06***	7.88***
Adjusted R-squared	.12	.12	.20	.20

*** p<0.001, ** p<0.01, * p<0.05, ^ p<0.10