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Patient Perceptions and Real-Time Observations of Bedside Rounding Team Communication: The Interprofessional Teamwork Innovation Model (ITIM)

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Background: Interdisciplinary rounds are designed to address barriers to teamwork, communication, and quality patient care. This study used multiple methods (observations, patient surveys) in two hospital sites to examine communication and teamwork in the Interprofessional Teamwork Innovation Model (ITIM).

Methods: Observations of 68 ITIM teams that completed 685 patient visits were conducted in a 302-bed community-based acute care hospital (CH) and a 569-bed academic medical center (AMC) in one academic health care system. Patients were asked to complete surveys about their experience with their ITIM team.

Results: Length of stay (LOS) in the CH was significantly and negatively associated with team structures and communication processes. LOS in the AMC was associated with communication processes. Geographic cohorting was a system factor associated with teamwork and communication processes that affect patient care and quality. A variety of communication processes were operating in ITIM teams, including soliciting questions from patients and staff, politeness, rapport, speaking percentages, and team-oriented communication. Patients were satisfied with their ITIM experience, indicating that their encounters were collaborative and supportive and contributed to their care experience.

Conclusion: This multimethod study illustrates the value of system-level approaches to structured patient-centered team care delivery and understanding the complexity of communication in team-based patient care. Findings suggest that when patients feel they are given opportunities to ask questions, speak without being interrupted, and have their questions answered, they tend to be satisfied with their experience of care. Health care leaders may consider ITIM to advance their mission of improving patient experiences and quality of bedside care.

There are many professional, cultural, and structural barriers to teamwork, communication, and patient engagement in hospital settings. The Institute of Medicine recommended interprofessional teams to optimize communication and address patient care complexity.[1] Interdisciplinary rounds (IDR) are one method for promoting collaboration and patient-centered care in hospitals.[2–5] The Interprofessional Teamwork Innovation Model (ITIM) was developed and implemented at the University of Kentucky beginning in January 2015.[6] This team-based model involves daily bedside rounds that include a bedside nurse, case manager or social worker, pharmacist, and hospitalist. Its aim is to bring providers together with patients and families to discuss plans of care, treatment, and discharge planning. A recent study found that ITIM implementation was associated with reduced 30-day same-hospital readmission and lower average direct cost per patient per day.[6] Two recent systematic reviews suggest that IDR studies often lack clear definitions and fail to report key details, processes, and outcomes.[4,5] Although research and practice have shown that communication in interprofessional teams is crucial to deliver quality care,[7] few data exist to explain the factors that influence communication processes and patient care delivery.

Communication issues in health care teams often stem from issues of power and status and ingrained cultural views that responsibility for performance in health care rests with individuals rather than teams, organizations, and systems.[1,7,8] Barriers to effective team communication are particularly acute in hospital care due to changing team memberships and providers caring for multiple patients simultaneously across different floors, units, and buildings.[8,9] Research suggests that teams can develop specific competencies that lead to better teamwork in clinical settings.[9–12] A primary goal of ITIM is to address these barriers through development and implementation of facilitated communication that generates a shared mental model for the care team and patient. Evaluating the implementation and fidelity of ITIM provides insight into how teams use communication and teamwork competencies that improve patient experience, a fundamental component of the Triple Aim.[13]

Systems theory offers a conceptual and applied framework for understanding how interprofessional bedside rounding teams function. The structure-process-outcome

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(SPO) model[14] specifies a time-tested framework for understanding ITIM implementation. ITIM team structure factors include hospital context, team composition, adherence to team guidelines, time on rounds, geographic cohorting (colocation of a physician's patients[4,6,9]), and team roles. Process includes communication in various forms, such as pre-room discussions, team introductions, care discussions, rapport with patients, team-oriented communication, polite interactions, and post-room debriefings. Outcomes may include length of stay (LOS) and patient experience. The SPO model can be applied to provide a clear picture of how various elements work together to deliver patient care and enables understanding of how ITIM teams function and what elements can be tailored as needed.

Gaining patient perspectives is important to understanding their experience with bedside rounding teams.[15] Patient experience is known to be a major indicator for quality[2] and has been linked to nurse and physician communication.[16] Research has shown that hospitalists desire more quality time with patients, which can in turn lead to increased hospitalist satisfaction.[17] Hospitalists who spend more time with patients, particularly when this time is focused on building relationships, were rated higher for physician-patient interactions.[18] These results suggested the need for systemic, communication-focused interventions.

This study sought to examine communication with the following aims: (1) identify relationships among observed teamwork structures, communication processes, and clinical outcomes; (2) assess fidelity of ITIM implementation at original floor and disseminated floors; and (3) understand patients' experience with ITIM teams.

METHODS

This study was approved by the University of Kentucky Institutional Review Board.

ITIM Intervention

The ITIM intervention was designed to improve interprofessional teamwork, communication and patient outcomes.[6] The implementation began in January 2015 on one floor at the community hospital (CH). Because of demonstrated success, the implementation was expanded to two floors at the academic medical center (AMC) in the same system in September 2016. The ITIM implementation guidelines can be found in Sidebar 1.

Setting and Procedures

This study employed observations and patient surveys to examine ITIM intervention at both the 302-bed CH and the 569-bed AMC. The CH floor observations occurred from January to May 2018. In the CH, 97.6% of ITIM teams were geographically cohorted, and nurse-patient ratios were 1 to 4 or 5. The AMC floor observations were conducted

Sidebar 1. Interprofessional Teamwork Innovation Model (ITIM) Round Structure

Goals/Purpose
- Involve patients, families, and team members (physician, nurse, case manager, PharmD, and other services) in the discussion about plan of care and daily goals.*
- Keep patients and families well informed of progress toward daily goals and the discharge plan. Update the plan of care as needed as the patient progresses.*
- Use teach-back with every patient encounter to promote enhanced understanding of care and decrease preventable readmissions.*
- Provide document for the patient to follow their progress and take notes.
- Improve interprofessional communication.
- Intervention guideline.

Physician/Advanced Practice Provider
- At beginning of rounds, inform team of rounding schedule.
- Lead team into room to greet patient/family and introduce team.*
- Lead plan of care discussion and provide update on patient status: reason for hospitalization, active problems, response to treatment, test results, and consults.*
- Make nurse, case manager, and/or pharmacist aware of new orders.
- Discuss potential discharge date and realistic time with team and patient/family.*
- Redirect to stay on time, as needed.
- Review and reiterate daily plan of care goals with team, patient, and family.*

Pharmacist
- Provide brief update on current medication and/or any changes to medications.
- Discuss any issues or concerns.
- Update medication orders if needed and able.

Case Manager
- Ensure next bedside nurse ready for the team.*
- Provide update regarding discharge plan: next site of care, what has been done, what needs to be completed, any potential issues delaying discharge.*
- Together with the physician, discuss potential discharge date and realistic time with team and patient/family.
- Update physician orders if needed or provide guidance to residents on what they will need to order pertaining to discharge planning (occupational therapy, physical therapy, intravenous antibiotic recommendations, and others).

Nurse (RN)
- Make patient aware of rounding process and time during shift change pass-off.
- Provide brief update: overnight events and goals for the day.
- RN checklist: vital signs, pain control, bladder, bowel, lines, drains, airway, wounds, mental status, falls, safety, and nutrition.
- Discuss and/or request needed orders.

Patient Care Associate/Unit Clerk
- Provide team with RN assignment list and phone numbers at beginning of shift.
- Print RN bedside report tool at beginning of each shift.

* Specific team contributions, roles, and responsibilities that facilitate ITIM.

between June and December 2018. Unlike the CH, geographic cohorting was lower (70.0%) in the AMC, and the nurse-patient ratio varied—in general, it was 1 to 4 or 5; for more complex patients, the ratio was 1 to 3 or 4. While patients in the CH were assigned to hospitalist teams after arriving at the floor, patients in the AMC were assigned to hospitalist teams when still being in the emergency department, which made it difficult to maintain cohorting. The role composition of ITIM teams in both sites was identical: hospitalists (MD), pharmacists (RPh), case managers (CM), bedside nurses (RN) and patients and families.

Observation Study Design

Observation was used to evaluate communication, teamwork, and fidelity to ITIM guidelines. Between January and December 2018, more than 158 hours of observations were conducted at the AMC and the CH of 68 ITIM teams that completed 685 patient rounds on 437 unique patients. We observed ITIM rounds to identify the types of communication and teamwork processes enacted during rounding. The observational tool was developed through a pilot study (detailed below). The tool facilitated assessment of structure factors (for example, team composition) and process factors (for example, communication). These factors were analyzed for their effect on LOS and 30-day all-cause readmission rates.

Observation Tool Development

The observation tool was developed in multiple stages. First, two authors [K.R., S.B.] performed general preliminary observations of seven separate ITIM team rounds at the AMC and the CH in 2017 (approximately 19 hours). Detailed notes were taken of communication and behaviors during rounds. Observed communication included information sharing, listening, rapport with patients, and using technology effectively.[8] Second, the ITIM project team members collaboratively developed a preliminary observation tool from the pre-observation process, bedside rounding literature,[4–6,9–12] and the project team's prior experience and needs of this study. This tool included time of entry and exit, greetings, introductions, reviewing plan of care, rapport building, team-oriented communication, team member voice, and estimated percentage of speaking. Third, five observers (graduate and undergraduate students) participated in several training sessions. Observers were walked through each step of the process, and appropriate notation was discussed to ensure that observers understood each measure. Researchers and observers met multiple times to address questions and gain further clarity before pilot observations. This process is detailed in a flowchart in Appendix 1 (available in online article).

Fourth, a pilot study was conducted in the CH to refine the observation tool for ease and accuracy of use in observing ITIM rounds. Observers used the developing tool as they observed one three-hour ITIM rounding on nine patients. Immediately following the pilot, researchers and observers met to discuss each observation and scoring. These pilot observations were not used in the result of this study. The final tool (see Appendix 2, online) included subcategories within each of the following categories: (1) team members at bedside, (2) introductions and acknowledgment, (3) connection with patient, (4) patient engagement, and (5) team communication. Ratings were made on two-point scales indicating presence or absence for all items except team-oriented communication (3-point, indicating preference for working with others while performing team tasks[12]), voice, rapport, attention to interactions (5-point Likert-type scales, 1 = not at all to 5 = a great deal), and estimated percentage of speaking by each team member in patient room. Observations included pre-entry outside-room huddle, bedside rounds, and hallway debriefing for each patient. Due to variations in team compositions, observation scores from each visit were used in the analysis. To assess interobserver agreement, two primary observers independently conducted 11 hours of observations of the same ITIM teams and 53 patient visits. Cohen's kappa[19,20] and intraclass correlation coefficient[21] were used to measure reliability and are reported in Table 1. Some observed factors, such as identifying daily goals, were less than 0.5 and thus not reported in the table. Any factor between 0.5 and 0.59 was not used in the analysis but was reported here to provide readers further information.

Patient Survey Data

Immediately following ITIM rounds, patients were asked to complete a 17-item survey regarding their experience with ITIM teams. Based on patient hospital survey literature, our expectation was to have ~30% of patients respond to the survey. The response rate was 22.1% (57/258) in the CH and 17.9% (36/201) in the AMC. In our observed patient population, many patients were simply too ill or incapable (for example, because they were medicated and sleeping) of completing surveys. To assess whether patient respondents were different from nonrespondent patients in the sample, analysis of variance tests of difference were conducted for *LOS, 30-day all-cause readmission, number of patients/round, total time of rounds, time in room, number of team members present, team introductions, rapport with patient, discharge plan discussion,* and *polite exit from room*. No significant differences were found between groups.

Survey items included patients' perceptions of communication with the team, extent to which team reviewed their plan of care, how much concern the team showed, and their overall satisfaction with the team. Research assistants read the survey aloud to those patients unable to answer the survey themselves. Patients were provided a visual aid (8.5 × 11-inch sheet taped to clipboard) of the scale "strongly disagree" to "strongly agree" to help them answer. In the CH, 23 (39.7%) patients completed the survey ver-

Table 1. Interobserver Agreement of Observational Measures

ITIM Structure Factors					
Team Members at Bedside			Introductions and Acknowledgment		
ITIM variable	kappa	*p*	ITIM variable	kappa	*p*
MD present	—*		Introductions	.66	< 0.001
RPh present	.66	< 0.001	*Teamwide introductions*	.66‡	< 0.001
CM present	.73	< 0.001	*MD-only introductions*	.66‡	< 0.001
RN present	.61	< 0.001	Family greeted if present	NA§	
Whole team present	NA†		Family engaged if present	NA§	
Average number of core members present	NA†				
Locate RN pre-room	.73	< 0.001			
Connection with Patient			**Patient Engagement**		
RN standing at bedside	.73	< 0.001	General plan of care review	.67	< 0.001
MD sitting at eye level	.88	< 0.001	Solicit questions	.84	< 0.001
Asked patient permission prior to exam	.78	< 0.001	Teach-back	.51	< 0.01
Physical touch of patient apart from exam	.73	< 0.001	Discharge plan discussion	.86	< 0.001
ITIM Processes					
Team Communication					
Pre-room care discussion	.83	< 0.001	Polite exit from room	.95	< 0.001
Pre-room team communication	.76‖	< 0.001	Post-room clarification debrief	.89	< 0.001
Pre-room knock/hello	.65	< 0.001	Post-room team communication	.73‖	< 0.001
Rapport with patient	.71‖	< 0.001	MD speaking percentage	.64‖	< 0.001
Team member voice	.67‖	< 0.001	RN speaking percentage	.45‖	
Each member asked for input while in room	.66	< 0.001	CM speaking percentage	.92‖	< 0.001
In-room team communication	.51‖	< 0.01	RPh speaking percentage	.69‖	< 0.001

* 100%.
† Calculated variable.
‡ Included in calculations of introductions.
§ Sample size ($N = 14$) too small to reliably calculate kappa statistic (see ref. 19 at the end of this article).
‖ Intra-class correlation to assess reliability for continuous/scale data.

bally and 35 (60.3%) filled out the survey on their own. In the AMC, 100% (35) of patients completed the survey verbally. The survey was developed following findings from Project ACHIEVE[22] to learn more about collaborative communication (such as engaging the patient), supportive communication (for example, showing concern), and patient experience.

Data Analysis

Data were analyzed using SPSS 24.0 (IBM Corp., Armonk, New York). Frequencies and percentages were calculated for descriptive data. Pearson's bivariate correlations, means, and standard deviations were computed for study variables. Data were evaluated for departure from normality and multicollinearity. Correlation was used to examine relationships among variables. For the observational data, hierarchical linear regression was employed to investigate the separate effects of structure and process factors using LOS as outcome variable. To control for unique effects, structure factors (time in room, number of team roles present, team introductions, general plan of care review, discharge plan discussion) were entered in the first step of the hierarchical regression model. Communication processes (soliciting questions from patients, input from staff, percentage speaking by MDs, politeness) were entered in the second step of the hierarchical regression model to assess the effect of process factors on patient LOS. Because multiple patients were visited on a single day by the same team, multilevel modeling was performed to assess whether a team effect was observed.

RESULTS

Observational Data Characteristics

As seen in Table 2, 438 visits (of 238 unique patients) were conducted by 42 ITIM teams in the CH, and 247 visits (of 199 unique patients) by 26 teams in the AMC. Observations were conducted based on the schedule of ITIM teams, with data collection occurring on Mondays, Wednesdays, Thursdays, and Fridays. No data were collected on Tuesdays because it was the hospitalist shift change day and typically entailed introductory discussions with patients and family in addition to ITIM rounds. The 42 teams in the CH were drawn from 20 hospitalists, 25 nurses, 5 pharmacists, and 2 case managers. The 26 teams in the AMC were drawn from 41 hospitalists, 40 nurses, 12 pharmacists, and 6 case managers. There was a mix of individual professionals

Table 2. Frequency of ITIM Team Visits

Visit Frequency	All Visits	CH Visits	AMC Visits
1	234	84	150
2	184	132	52
3	93	75	18
4	36	28	8
5	20	15	5
6	18	18	
7	7	7	
10	20	20	
11	11	11	
Subtotal	623	390	233
With missing data in EHR	62	48	14
Total	685	438	247

ITIM, Interprofessional Teamwork Innovation Model; CH, community hospital; AMC, academic medical center; EHR, electronic health record.

Table 3. Characteristics of ITIM Observation Data and ITIM Patients

ITIM Variable	CH	AMC
Total team rounds	42	26
Unique patients	238	199
Total patient visits	438	247
Average time of rounds; minutes (SD)	132 (28)	115 (36)
Average patients/rounds (SD)	11.5 (1.6)	9.5 (1.7)
Average time in patient room; minutes (SD)	7.1 (4.9)	7.2 (4.6)
Geographic cohorting (%)	98.6	70.0
Average LOS; days (SD)	12.6 (13.9)	25.9 (26.1)
Case mix index (SD)	1.41 (0.86)	2.12 (1.4)
Patient age; years (SD)	55.7 (18.6)	53.8 (17.2)
Patient gender; female (%)	81 (34.0)	89 (44.7)
Patient race; white (%)	160 (67.2)	162 (81.4)
Patient ethnicity; non-Hispanic (%)	181 (76.1)	165 (82.9)

ITIM, Interprofessional Teamwork Innovation Model; CH, community hospital; AMC, academic medical center; SD, standard deviation.

in each unique ITIM team; 78.5% of patients in the CH and 35.6% of patients in the AMC experienced multiple visits.

As seen in Table 3, more patients were seen in each average rounds in the CH (11.5) than in the AMC (9.5). The average census was approximately 13 for the CH and 12 for the AMC at that time. Not every patient on the team was rounded every day; for example, patients ready for discharge but waiting for nursing home placement or patients in the hospital to receive intravenous antibiotics for weeks were not rounded on by the ITIM team daily. Average LOS was higher in the AMC (25.9 days) than in the CH (12.6), $p < 0.0001$, as were comorbidities (case mix index: AMC 2.12, CH 1.41, $p < 0.0001$), indicating a more medically complex patient population in the AMC. Further observational data and unique patient demographics are presented in Table 3.

Structures, Processes, and Outcome

Given the differences in sites, separate correlation and regression analyses were conducted for each hospital. The correlation tables (see Appendices 3 and 4, online) were organized by outcome (that is, LOS), time in room, and number of team members, followed by the order in which the team encountered the patient, with pre-room discussion first, followed by in-room interactions, then post-room debriefing, and finally patient satisfaction from the patient survey.

In the CH (Appendix 3), LOS was significantly and negatively correlated with the ITIM structure factors *time in room*, *team introductions*, *general plan of care review,* and *discharge plan discussion*. LOS was negatively correlated with the following communication processes: *soliciting questions from patients*, *asking for input from staff*, *MD speaking percentage*. LOS was positively correlated with *RN speaking percentage*. Hierarchical linear regression was employed to determine which structure and process variables were most salient to LOS. Structure factors were entered in the first block and process factors were entered in the second block to understand the separate impact of each set of factors. Results (Table 4) reveal that three structure factors, *time in room* ($\beta = -0.12$, $p = 0.013$), *team introductions* ($\beta = -0.15$, $p = 0.005$), and *discharge plan discussion* ($\beta = -0.16$, $p = 0.002$), and two process factors, *soliciting questions* ($\beta = -0.13$, $p = 0.01$), and *MD speaking percentage* ($\beta = -0.15$, $p = 0.003$), explained 13.4% of the variance in LOS ($F[3,370] = 8.166$, $p = 0.000$]. Each of these structure and process factors were significantly and negatively associated with LOS in the CH. As noted in the Methods section, because patients were seen by the same team on the same day, multilevel modeling was performed to assess team effect. There was no evidence of any team effect in either hospital.

In the AMC (Appendix 4), LOS was significantly and negatively correlated with ITIM structure factors *time in room*, *team introductions*, and *discharge plan discussion* and communication process factors *polite exit from room* and *post-room team-oriented communication*. Results (see Table 4) of hierarchical linear regression indicate that although *time in room* ($\beta = -0.10$), *team introductions* ($\beta = -0.09$), and *discharge plan discussion* ($\beta = -0.12$) nearly reached significance with p values between 0.053 and 0.077 in the first block, the only significant factor was *polite exit from room* ($\beta = -0.20$, $p = 0.004$). The model explained 10.4% of the variance in LOS ($F[1,208] = 6.067$, $p = 0.000$). In addition, there were few meaningful relationships between 30-day all-cause readmission rates and the observation data in either site. In the CH these were *time in room* ($r = -0.11$, $p = 0.02$), and *team introductions* ($r = -0.11$, $p = 0.02$); in the AMC, they were *MD sitting at eye level* ($r = 0.13$, $p = 0.04$), and *RN attention* ($r = -0.22$, $p = 0.01$).

Table 4. Hierarchical Regression Model, Length of Stay, Two Hospitals

Site: CH			Site: AMC		
	Step 1: Structure	Step 2: Process		Step 1: Structure	Step 2: Process
ITIM Structure	**B, SE**	**B, SE**	**ITIM Structure**	**B, SE**	**B, SE**
Time in room	-.10*, 3.5	-.12*, 3.5	Time in room	-.12, 10.6	-.10, 10.6
Team introductions	-.16†, 20.3	-.15†, 19.7	Team introductions	-.13, 46.8	-.09, 46.8
Gen. plan of care review	-.12*, 64.4	-.09, 63.3			
Discharge plan discussion	-.15†, 34.4	-.16‡, 34	Discharge plan discussion	-.13, 87.5	-.12, 86.1
Process			**Process**		
Soliciting questions		-.13†, 33.1			
Input from staff		-.08, 46.4			
MD speaking percentage		-.15†, .92			
RN speaking percentage		.04, 2.1			
			Polite exit from room		-.20†, 215.3
R^2	.09‡	.13‡		.07**	.10‡

CH, community hospital; AMC, academic medical center; B, standardized regression coefficient; SE, standard error; R^2, variance.
*$p < 0.05$.
† $p \leq 0.01$.
‡ $p < 0.001$.

Communication and Teamwork Relationships

Correlation was employed to understand which observed communication and teamwork factors facilitate ITIM implementation (Appendices 3 and 4). *MD speaking percentage* was negatively associated with *number of team members present*, *discharge plan discussion*, *rapport with patient*, *team voice*, and *CM/RPh speaking percentage* and LOS. This finding illustrates the complexity of teamwork and how missing team members can reduce the benefits of teams. *MD sitting at eye level* with the patient was correlated with a number of positive factors, such as *touching patients aside from exam* (for example, on the shoulder while talking), *rapport with patient*, *team voice*, and *team communication* pre- and post-room.

Communication factors had robust relationships with other observed factors. *Rapport with patient* and *team voice* were developed from prior research of ITIM teams.[8] *Rapport with patient* was associated with many observed items, including *MD sitting at eye level*, *team voice*, and *team introductions*. *Team voice* was positively correlated with *MD sitting at eye level*, and *CM/RPh speaking percentage*. Other relationships of note included *locate RN pre-room* (before entering the room) with *pre-room care discussion*, and *number of team members present*, a key fidelity issue for ITIM teams.

Implementation Fidelity

Individual observational items were grouped conceptually for fidelity assessment in Table 5. High (> 80%) levels of adherence were observed for *presence of physicians and pharmacists* (Team Members at Bedside); *family greeted/engaged when present*, particularly at the CH (Introductions and Acknowledgment); *plan of care reviews* (Patient Engagement); and *pre-room knock/hello*, *MD speaking percentage* in the AMC, and *polite exit from room* (Communication). Low (< 60%) levels of adherence were observed for many factors, including *whole team present* in the AMC (Team Members at Bedside); *teamwide introductions* (Introductions and Acknowledgment); all Connection with Patient variables, particularly *MD sitting at eye level; teach-back* (Patient Engagement); and *each team member asked to speak while in patient room* and *RN/CM/RPh speaking percentages* (Communication). There were differences in fidelity by hospital site. In the CH there were more team members at bedside. Teams in the AMC were higher in *rapport with patient*, *team member voice*, and *CM speaking percentages*. In summary, there was variation in fidelity to ITIM guidelines in general and across hospitals.

Patient Experience with ITIM

As seen in Table 6, 93 patients responded to the survey and favorably rated their ITIM team. Table 6 lists the items according to conceptual categories: supportive communication, collaborative communication, and patient experience.[22]

The relationship between patient perceptions and observation data was assessed across four variables. Degree of convergence was evaluated between observational data (O) and patient perceptions (P) using four measures: (1) *solicit questions* (O) and *team encouraged me to ask questions* (P), (2) *plan of care review* (O) and *team worked with me on my plan of care* (P), (3) *team-oriented communication* (O) and *team effectively communicated with each other* (P), and (4) *time in room* (O) and *how much time did team spend with you today* (P). Using *t*-tests, there were no significant differences for the first two pairs, *questions asked*, nor *plan of care review* (*in-room team communication* was not analyzed

Table 5. ITIM Implementation Fidelity

Team Members at Bedside ITIM variable	CH	AMC
MD present	100%	100%
RPh present	95.4%	92.2%
CM present	75.1%	61.6%
RN present	79.5%	50.4%
Whole team present	62.1%	31.4%
Average number of core members present	3.5	3.04
Locate RN pre-room	84.7%	67.2%
Time in room	7.1 min.	7.2 min.
Introductions and Acknowledgment		
Introductions	45.7%	65.4%
Teamwide introductions	*26.3%*	*57.7%*
MD-only introductions	*19.4%*	*7.7%*
Family greeted if present	90.8%	65.2%
Family engaged if present	91.5%	79.4%
Connection with Patient		
RN standing at bedside	21.1%	57.6%
MD sitting at eye level	13.5%	21.5%
Asked patient permission prior to exam	41.8%	51.4%
Physical touch of patient apart from exam	39%	36.6%
Patient Engagement		
General plan of care review	91.1%	95.5%
Solicit questions	54.9%	62.4%
Teach-back	8.8%	12.4%
Discharge plan discussion	38.9%	44.9%
Team Communication		
Pre-room care discussion	83.8%	75.7%
Pre-room team communication	76.3%	58.3%
Pre-room knock/hello	97.9%	97.2%
Rapport with patient	2.59	3.61
Team member voice	3.17	3.84
Each member asked to speak while in patient room	14.4%	21.6%
In-room team communication	42.7%	33.6%
Polite exit from room	84.7%	96.3%
Post-room clarification debrief	71.6%	60.7%
Post-room team communication	64.2%	47.9%
MD speaking percentage	83.7	80.3
RN speaking percentage	5.1	7.2
CM speaking percentage	4.4	14
RPh speaking percentage	7.3	6.7

ITIM, Interprofessional Teamwork Innovation Model; CH, community hospital; AMC, academic medical center; RPh, pharmacist; CM, case manager.

Table 6. Patient Experience by Conceptual Category

Supportive Communication	CH ($N=58$) M, SD	AMC ($N=35$) M, SD
The team takes my health concerns seriously.	4.2, .96	4.4, .61
The team showed interest in me.	4.3, .90	4.5, .61
The team expressed concern for me when it visited me.	4.3, .80	4.5, .61
I feel the team cares about me.	4.2, .99	4.3, .89
Collaborative Communication		
The team asked for my input regarding my care today.	4.1, 1.1	4.2, .88
The team listened to what I had to say.	4.3, .93	4.4, .77
The team talked to me about my goals and overall plan of care in the hospital.	4.2, 1.1	4.2, .92
The team worked with me on my plan of care.	4.1, 1.1	4.3, .82
The team encouraged me to ask questions today.	4.2, 1.0	4.3, .82
The team took enough time to answer my questions and provide information.	4.4, .77	4.5, .56
My care was explained to me in words that were easy to understand.	4.3, .87	4.3, .67
The team checked to make sure I understood what is going on today.	4.3, .75	4.3, .76
Patient Experience with Team		
The team gave its best effort when it visited my room today.	4.2, .95	4.3, .76
The team effectively communicated with each other today.	4.2, 1.0	4.1, .86
I believe that the team has my best interests at heart.	4.3, .95	4.5, .51
How much time did the team spend with you today?	14.2 min.	10.3 min.
Overall, I am satisfied with this team.	4.3, 1.1	4.5, .70

CH, community hospital; AMC, academic medical center; M, mean; SD, standard deviation.

statistically due to low reliability). Patients did perceive *in-room time* (12.5 minutes) as significantly longer than observers (7.6 minutes, $p < 0.001$). Delving deeper, we examined percentage agreements (observers noted it occurred, patients responded with "agree" or "strongly agree"). Observers noted that teams *solicited questions* 54.9% (CH) and 62.4% (AMC), while patients (86.2% in the CH, 88.6% in the AMC) perceived they were *encouraged to ask questions*. Observers recorded *plan of care review* occurring in 91.1% of visits in the CH and 95.5% of visits in the AMC. Patients perceived their *goals and plan of care* were reviewed in 82.8% (CH) and 88.6% (AMC) of visits. Observers noted *in-room team communication* in 42.7% (CH) and 33.6% (AMC) of visits, while 82.8% of CH patients and 85.7% of AMC patients perceived their *team effectively communicated with each other today*. As seen in Appendix 4, in the AMC, patients' *satisfaction with ITIM team* was highly correlated with observed *rapport with patient* ($r = 0.52$, $p = 0.001$) and *polite exit from room* ($r = 0.62$, $p = 0.001$).

DISCUSSION

Bringing key personnel and providers together in formal teams with patients and family caregivers to discuss

quality of care, patient status, and general concerns is an important improvement strategy in hospital care.[1,4–6] Our findings suggest three implications for bedside rounding practice and research. First, geographic cohorting was a system-level factor associated with implementation processes that affect patient care and quality. Second, this study identified a variety of communication processes operating in these teams that go well beyond coordinating mechanisms. Examples of communication processes operating in these rounding teams included soliciting questions from patients and staff, politeness, rapport, speaking percentages, and team-oriented communication. Third, patients reported positive experiences with ITIM teams, indicating that their encounters were collaborative and supportive and contributed to their care experience.

The first implication of this study is that a system-level factor, geographic cohorting, was important to teamwork, communication, and patient care. Our research suggests that in settings like the CH, the more actively ITIM structures and processes are in place, the higher the fidelity of ITIM implementation and the shorter the LOS. Geographically cohorting teams may improve team efficiency by consistently bringing together the same team for the patients.[4,6] Regular plan of care review and discharge planning are key components discussed in daily ITIM rounds.[6] With most patients cohorted on the same floor for each hospitalist, the team can have a consistent schedule and approach for interprofessional bedside rounding focus on updates regarding discharge plans, next site of care, status reports, and potential issues delaying discharge. In the AMC, where patients were not systematically cohorted (70.0%), differences in implementation fidelity may be explained by availability of all team members: There were higher levels of whole teams present in the CH compared to the AMC. This difference across hospitals may be explained by geographic cohorting, which reduces barriers to standardizing rounding processes and developing relationships with patients. Alternatively, the more medically complex population in the AMC may have required more services and higher interprofessional collaboration in delivering care, which may explain why the AMC teams were rated more highly in team introductions, rapport with patients, team member voice, CM speaking percentage, and polite exits from rooms. Significantly, there was no consistent association between time spent in the room and discharge plan discussion—that is, no association was identified in the CH, while a positive association was shown in the AMC. Therefore, spending more time rounding was not necessarily associated with implementation fidelity, such as discharge plan discussion. Although colocating team members was important, fidelity to implementation is an ongoing challenge. The low level of some behaviors (for example, teach-back, other team members speaking) may improve through such factors as sharing results, providing feedback on ITIM key component implementation, providing refresher training, conducting targeted Plan-Do-Study-Act (PDSA) cycles for improvement, and understanding more about postdischarge placement. Additional issues that may warrant further investigation include factors such as system inefficiencies with procedures, availability of consultants and tests, placement delays, and socioeconomic status of the patient population.

A second implication of this study is that team-based patient-centered communication is much more important than frequency of interaction and transmission of information in facilitating effective teamwork and improving patient experience.[22–25] As research[10–12] indicates, communication is an important and coordinating mechanism in teams. Our study describes *types* of communication that occurs in rounds, suggesting that communication is more than coordination. A key advantage to observing communication in real time is the ability to capture categories of communication that occur among team, patient, and family. For example, the relationship between communicating at eye level and patient rapport indicate that patient-centered communication is a *set* of skills that enhance the patient experience. This is a powerful contribution, one that suggests communication that is rich, meaningful, and substantive can contribute to health care team performance.[8,22,23,26]

Our study indicates the value of the whole team interacting with the patient during bedside rounds. The whole team was present for only 31.4% of rounds in the AMC and 62.1% in the CH; this may be why MDs had to speak more than other members. Team-oriented communication—the degree to which team members communicate with others while performing team tasks—is firmly grounded in team theory.[12] The whole team is key to success and performance. Our findings suggest that ITIM bedside rounds teams improved interprofessional communication, facilitated patient discussion, and enhanced the patient experience. The unique yet collaborative roles taken by individual health professionals illustrate the diversity of communication processes manifested in ITIM teams. Our focus in this study was to examine and bring to light the variety and types of communication processes that facilitate effective teamwork and improve the patient experience. In this sense, communication is more multifaceted than a coordinating mechanism of teamwork.

Our third implication is that effective ITIM team functioning enhances the patient experience. Not only were patients generally positive regarding their ITIM team experience, agreement among them regarding the teams was consistently high. This suggests that patients may assess their experience based on their interactions with teams during their stay. Although the sample size was relatively small, *patient satisfaction*, an important element of patient experience, was significantly related to *discharge plan discussion* and *politeness* and negatively related to the amount of talking by their physician. The amount physicians talked during ITIM team rounds, which were designed to promote a broader distribution of communication from all

members of the team, is an important finding of this study. Physicians' speaking amount is a complex phenomenon: Although it was negatively related to *rapport with patient*, *team voice*, and *discharge plan discussion*, it was associated with lower LOS, indicating the multifaceted and nuanced nature of team communication. Correspondingly of interest is the degree to which teams engaged in respectful interactions. Our study found polite interactions associated with lower LOS in the AMC, suggesting the potential value of respectful, patient-centered communication processes within team-based structures. Politeness toward patients and among team members affects willingness to seek help, speak up and, share information.[27–29] Health care systems can and should facilitate an environment in which all team members participate. Teams in name only risk reducing patient care quality and experience.

Another interesting point involves the relationship between observations and patient perceptions. In this study, patients perceived they were encouraged to ask questions at a higher level (approximately 87% between both sites) than observers noted (about 58%, both sites). This suggests that when patients feel they are given opportunities to ask questions, are not interrupted, have their questions answered, believe the team cares about them, and feel they are being heard, they tend to perceive spending more time with and having a more positive patient experience with their care team.

Limitations

This study had several limitations. First, despite meeting nearly all recently suggested reporting guidelines for IDR research,[4] we were not able to have a true control group. Second, due to the cross-sectional nature of our study, we cannot make causal inferences. Third, although every patient was asked to participate in the survey, the sample size for evaluating patient experience was small. Fourth, although training of the observers was comprehensive, interrater reliability was assessed using two observers. Fifth, because of staffing issues, the different timing of data collection at two sites may have affected our results, particularly as seasonal influences can affect patient mix and hospital workflows.

CONCLUSION

The findings of this study indicate that system-level factors such as geographic cohorting were associated with teamwork and communication processes that affect patient care and quality. Our study found a broad array of communication processes operating in ITIM teams, suggesting that communication is more than simply a coordinating mechanism or information transfer. We found each health professional taking unique yet collaborative roles in ITIM rounds, connecting with patients, engaging in interactive communication, and getting input from other team members. Results indicate that patients were satisfied with their experience with ITIM teams. Patients reported their ITIM team encounters as collaborative, supportive, and positively contributing to their care experience. Fidelity to teamwork processes is an ongoing quality improvement issue for patient teams. Further research may examine program drift, particularly when there are frequent staff changes and other systematic shifts in the institution. Given the prior research on the importance of bedside rounding factors such as geographic cohorting[4–6] and communication[4–8,18,22–24] to improve the patient experience, these findings may help hospital leaders understand which system factors enable better quality care and improve patient experience.

Conflicts of Interest. All authors report no conflicts of interest.

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SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jcjq.2020.04.005.

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