JOURNAL OF INTERNATIONAL CRISIS AND RISK COMMUNICATION RESEARCH
ISSN: 2576-0017
2024, VOL 7, NO S6

Assess Unit-Based Care Teams and the Regularity and caliber of communications between physicians and other medical teams

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Abstract
Background: Ineffective communication between healthcare providers, particularly between **physicians and other medical teams**, is a significant contributor to medical errors and adverse patient outcomes. Prior research has suggested that factors such as mutual understanding, openness, and proximity can enhance communication and, in turn, improve patient safety. This study examines whether the introduction of unit-based care teams in pediatric medical wards can impact the frequency and quality of communication between **physicians and other medical teams. Methods**: A prospective intervention study was conducted ,two resident teams were reorganized to operate within specific inpatient units. Data were collected from 60 residents and 154 Other medical teams using communication logs, with a focus on direct interactions, timeliness, and perceived quality of responses. Paging records were also analyzed. Statistical analysis was performed using generalized estimating equations to assess differences across the phases.**Results**: The intervention led to significant improvements in communication patterns. Residents showed increased awareness of their primary other medical teams ($P = .05$), with more frequent in-person contact ($P = .01$). Other medical teams also reported improved knowledge of their assigned interns and increased in-person communication with them ($P < .001$). Residents' perceptions of timely responses from other medical teams significantly improved ($P = .009$). Paging records revealed a 42.1% reduction in the mean number of daily pages received by residents ($P < .001$). Despite these improvements, there was no significant change in the time spent discussing patient conditions.**Conclusion**: Reorganizing care teams into unit-based models enhanced the frequency and quality of communication between other medical teams and resident physicians, leading to improved perceptions of responsiveness and a reduction in the use of paging systems. These changes suggest that proximity and structure in team organization can foster better communication dynamics, potentially improving patient care and safety. Further research is needed to explore the long-term impact of such interventions on patient outcomes.

Introduction

Ineffective communication is a significant factor contributing to medical errors (1-12). In particular, breakdowns in communication between other medical teams and physicians can have harmful effects on patient outcomes (13, 14).

Research (14-16) has identified several specific aspects of communication within multidisciplinary teams that may influence patient safety, including factors such as mutual understanding, openness, and collaborative efforts. Promoting face-to-face interactions among healthcare providers is suggested as an initial step in encouraging these positive dynamics (3).

This study aimed to examine whether the introduction of unit-based care teams could impact the frequency and quality of interactions between nursing staff and resident physicians. The underlying assumption was that reorganizing care teams in this way would foster more direct communication and strengthen the perception among team members that their concerns related to patient care were being addressed. To our knowledge, this is the first investigation into how caregiver proximity influences team communication.

Methods

A prospective intervention study was conducted in pediatric medical wards to evaluate communication strategies. two resident teams were reorganized to operate within specific inpatient units. This change was prompted by positive feedback from other medical teams and residents who had collaborated in a smaller unit previously.

In the original setup, patients were assigned to teams based on their medical conditions. For instance, certain teams handled hematology and endocrinology patients, while others managed pulmonary and renal patients. General pediatrics patients were equally distributed. Under the intervention, patients were assigned to teams based on bed availability rather than disease, and no other teams admitted patients to the designated units. Subspecialty patients with specific requirements were treated separately. Admissions were alternated between units to balance team workloads, although even distribution was not always possible due to differing bed capacities

Under the new arrangement, rounds were conducted within unit-based conference rooms.

Communication patterns between residents and other medical teams were assessed across nine weeks of data collection.Data collection during early post-intervention excluded holiday periods and occurred before implementing the night-float system. This design allowed for separate groups of residents to be evaluated as they rotated through services.

Each week, residents completed a brief log detailing their communication with other medical teams , focusing on the patient they perceived as having the most complex condition to reduce recall bias. Questions included:

1. Identification of the patient's primary other medical teams (yes/no).
2. Primary means of other medical teams contact (e.g., page, phone, in person).
3. Primary means of resident contact with the other medical teams (e.g., phone, message, in person).
4. Total time spent discussing the patient (e.g., 0-5 minutes, 6-10 minutes).
5. Timeliness of other medical teams response to concerns (5-point Likert scale).

Other medical teams also completed similar questionnaires, independent of resident responses, focusing on their most complex patient. Paging records for residents were obtained to analyze the frequency of pages per 24-hour period.

To control for confounding factors, hospital administrative data on patient demographics (e.g., census, age, illness severity, and insurance status) were collected during all study phases. Approval was obtained from the institutional review board.

Statistical Analysis

Proportions of respondents identifying primary caregivers and reporting in-person contact were calculated for each study phase. Time spent discussing patient conditions was categorized as 15 minutes or more and analyzed proportionally. Likert scale responses regarding timeliness of addressing concerns were grouped as "strongly agree" versus all other ratings. Paging data were summarized as means with standard deviations. Intern and senior resident data were combined due to the small number of senior residents.

Generalized estimating equations were used to compare responses across study phases, accounting for variability in individual response rates and repeated measures. Post hoc analyses combined data from the two post-intervention phases to assess systematic differences between the two units, such as bed capacity.

Patient characteristics were summarized using means and standard deviations for continuous variables and proportions for categorical data. Comparisons between pre- and post-intervention phases used t-tests and χ^2 tests, respectively. Statistical analysis was performed using SAS software (version 9.2), with significance defined as $P < .05$.

Results

Out of 81 residents eligible for participation, 74.1% (60 residents) joined the study, completing at least one valid, time-specific questionnaire. Among them, 24 individuals were eligible during multiple rotations. Across 107 potential resident rotations, data were collected for 77 of them, with 9 residents contributing data at more than one time point. In total, 201 questionnaires addressing communication patterns were filled out by residents.

For other medical teams , 154 out of 179 eligible participants (86.0%) took part in the study, completing 652 time-specific questionnaires focused on their communication patterns. To ensure anonymity, no demographic details were collected for physicians or other medical teams .During the study period, the patient census was comparable between the two examined years, with a slight increase in the number of patients recorded in the second year (1669 vs. 1710). The average patient age was slightly higher in the latter period (7.0 ± 7.0 vs. 7.6 ± 7.0 years, P = .01), while other patient characteristics remained consistent.

After implementing the unit-based care model, residents showed increased awareness of their patients' assigned other medical teams (62.3% vs. 82.8% vs. 82.5%, P = .05). Residents more frequently reported contacting other medical teams in person (27.3% vs. 64.9% vs. 56.9%, P = .01) and being contacted in person by other medical teams (7.7% vs. 48.2% vs. 55.2%, P = .002), as opposed to communication via intermediaries such as phone or

pager. Additionally, there was a significant improvement in residents' perception of other medical teams responding promptly to their concerns (44.2% vs. 82.1% vs. 81.8%, P = .009).
Despite these changes, the overall time residents spent discussing patient conditions with other medical teams remained unchanged. A subsequent analysis revealed no major differences in responses between residents assigned to teams managing 21 beds versus those handling 29 beds.
Paging records were available for 76 out of 77 eligible residents, as one participant's data had been deleted following their graduation. These records, spanning multiple time points, revealed a substantial 42.1% reduction in the mean number of daily pages residents received after the intervention, decreasing from 19 to 10 to 11 per day (P < .001).

Other medical teams Communication Data
Data collected from other medical teams corroborated the observed changes in communication patterns among residents. Other medical teams demonstrated improved knowledge of which intern was assigned to a patient (71.3% vs. 83.4% vs. 87.8%, P = .01) and were better able to identify the supervising resident responsible for a patient (58.7% vs. 79.6% vs. 82.1%, P < .001).
Other medical teams reported an increase in direct, in-person communication with interns (31.8% vs. 54.5% vs. 65.9%, P < .001) and also noted contacting interns in person more frequently regarding patients with the most complex conditions (12.5% vs. 52.5% vs. 61.5%, P < .001). However, there was no significant change in the overall frequency of other medical teams contacting interns about such patients (8.6% vs. 9.5% vs. 8.1%, P = .89).
Finally, other medical teams were significantly more likely to strongly agree that residents addressed their concerns in a timely manner during the post-intervention period (38.3% vs. 37.8% vs. 49.5%, P = .04).

Discussion
The reorganization of care teams within a unit-based structure led to notable improvements in physicians' and other medical teams ' ability to identify key colleagues and engage in face-to-face communication. This restructuring also enhanced perceptions among both groups that patient care concerns were being addressed effectively. Furthermore, a significant reduction in the frequency of pages received by physicians was observed following the intervention.
Breakdowns in communication are increasingly recognized as a primary factor in adverse patient outcomes. For instance, earlier research (4) investigating approaches to reduce medication errors in pediatric inpatients found that enhancing physician-other medical teams communication, such as by increasing other medical teams ' involvement during rounds, could have prevented 17.4% of all medication errors and 29.2% of high-risk errors. Another study (5) analyzing medical error reports in neonatal intensive care settings revealed that communication problems were a factor in 22% of reported incidents. In the context of the most severe errors, often referred to as sentinel events, communication failures are especially prevalent. Data from the Joint Commission attribute 66% of sentinel events to communication breakdowns, marking it as the leading cause of these errors (17).
Specific communication elements, such as fostering in-person interactions between other medical teams and physicians, may contribute to improved patient safety by enhancing timeliness, accuracy, understanding, collaboration, and openness among care providers (14-16). Physicians in this study noted that responses to their concerns became more prompt and that patient care issues were better addressed in the unit-based structure, which allowed for more direct interactions. These face-to-face discussions likely improved understanding by facilitating nonverbal communication cues regarding patient conditions and concerns (18). The ability to better identify team members may also have fostered a collaborative and transparent environment (19). The concurrent reduction in paging supports the potential benefits of this intervention for patient care quality (20-23).
However, discrepancies existed between other medical teams ' and physicians' perspectives. Although both groups showed similar improvements in identifying key personnel (approximately 60% pre-intervention vs. 80% post-intervention), they differed in their assessments of responsiveness and time spent discussing patient conditions. Other medical teams consistently reported lower levels of responsiveness from physicians and shorter discussion durations for complex patient cases compared to residents' reports. These differences may partially stem from variations in patient assignments, as experienced other medical teams may manage multiple patients with complex needs, resulting in fewer interactions with individual physicians. Alternatively, these responses might reflect underlying biases or attitudes, with other medical teams potentially underreporting interactions if they feel undervalued and physicians possibly overestimating the time spent in discussions. Further qualitative research and direct observation could provide greater clarity on these differences (24).
This study has limitations. It evaluated a nonrandomized intervention at a single site during a period when other changes were also underway. For example, the introduction of a night-float system may have influenced communication patterns, although observed changes were already evident before its implementation. Notably, other medical teams ' perceptions of residents' responsiveness did not improve until the second post-intervention

period, possibly reflecting the impact of the night-float system or seasonal variations in patient census and resident learning. Additionally, unmeasured changes, such as increased other medical teams participation during rounds and extended bedside time for physicians, may have contributed to improved communication. While these changes could have occurred independently of the geographic reorganization, it is likely that the intervention facilitated their implementation (25).

This study did not address key aspects such as communication during off-shifts, direct impacts on patient outcomes, or the effect on resident education, highlighting important areas for future research. To our knowledge, this is the first study examining the impact of geographically structured care teams on communication within general pediatrics units. The observed shift toward more direct physician-other medical teams communication, alongside reduced paging, demonstrates potential for enhancing patient outcomes. Nonetheless, with only 49.5% of other medical teams agreeing that residents responded to concerns promptly after the intervention, significant room for improvement remains. Future studies should explore how targeted changes in communication practices can further improve care quality and safety while assessing their direct effects on patient outcomes.

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