Variation in Communication Loads on Clinical Staff in the Emergency Department

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Study objective: We determine whether there are differences in role-related communication patterns in the emergency department (ED).

Methods: This was an observational study of a metropolitan ED. Four medical officers and 4 nurses were observed for 19 hours and 52 minutes. Communication load was measured by proportion of observed time in communication, proportion of concurrent communication events, and proportion of interruptions.

Results: Eight hundred thirty-one communication events were identified, an average of 42 events per person per hour. Eighty-nine percent of clinicians' time was spent in communication. Synchronous communication channels, involving face-to-face or telephone conversations, were used in 84% of events. One third of communication events were classified as interruptions, averaging 15 interruptions per person per hour. Senior medical and nursing staff experienced higher rates of interruption than junior medical staff and registered nurses with an allocated patient load.

Conclusion: There was considerable variation in communication loads on clinical staff occupying different roles in the ED. Medical registrars had a high proportion of interruptions and spent the most time dealing with interruptions. These new data suggest some clinical roles may be at higher risk of communication overload than those of the general clinical population.

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Editor's Capsule Summary

What is already known on this topic

There are high rates of communication failures (interruptions and/or communication multitasking) in the emergency department (ED). Communication failures may be a preventable source of medical errors.

What question this study addressed

This observational study evaluated the communication patterns and communication loads among attending physicians, resident physicians, charge nurses, and staff nurses.

What this study adds to our knowledge

Individuals with greater authority for overall ED operation experienced a higher communication load and higher communication interruption rate. Overall, up to one third of all communication time was spent with communication interruption.

How this might change clinical practice

It has not yet been determined how to optimize communication in the ED, but this study suggests improvement is needed, particularly among those providing direct patient care and in positions of higher authority.

INTRODUCTION

Background

Communication failures in the health system have been reported to be a large contributor to preventable adverse clinical outcomes.[1,2] In the emergency department (ED), studies have demonstrated that clinicians experience high communication loads.[3,4] In situations in which individuals carry out multiple concurrent tasks, interruptions are seen as a source of concern because they may negatively affect a clinician's working memory and lead to errors.[5] ED clinicians have been identified as being particularly at risk of communication overload, with reports that they may spend up to 80% of their time in communication, with 30% of all communication events classified as interruptions and 10% of the communication time involved in 2 or more concurrent conversations.[4]

Importance

Studies have repeatedly shown that clinicians prefer interaction with colleagues as the main method for answering clinical questions.[3,4,6,7] Examining communication patterns identifies which work practices are likely to be generators of high communication load, providing information to appropriately target interventions to support and improve communication practices in the ED.

Goals of This Investigation

If communication loads are associated with specific work patterns, then one would expect load to vary with clinical roles. The aim of this study was to determine whether there are differences in role-related communication patterns in an ED and to identify whether specific clinical roles are particularly at risk of high communication loads because communication overload may predispose clinicians to making errors.

MATERIALS AND METHODS

Theoretical Model of the Problem

It has been hypothesized that interruptions impose cognitive loads on clinical staff, leading to clinical error.[4] Specifically, when an individual's working memory is occupied with several items, an interruption may disrupt working memory, resulting in forgetting some items.[5] Communication load is a measure of the impact of organizational process on individuals and indicates under which circumstances cognitive resources are likely to be stretched. We characterize communication load by the time spent in communication, the time involved in communication multitasking, and the number of interruptions (Table 1).

Study Design and Setting

This was an observational study conducted in the ED of a large metropolitan teaching hospital in New South Wales, Australia, between July and September 2001.

Selection of Participants

Four registered nurses (RNs, hereafter referred to as nurses) and 4 medical officers volunteered after information sessions. Informed consent was obtained.

Methods of Measurement

The Communication Observation Method[8] was used to measure communication loads, measured by the proportion of observed time spent in communication, the proportion of communication events involving concurrent communication tasks, and the proportion of interruptions experienced by subjects.

Data Collection and Processing

Subjects were shadowed for 2 to 4 hours by a clinically trained observer during the morning, afternoon, or night shift. Conversations were audiorecorded, and the researcher observed from a distance while timing events and taking field notes. Ethical approval was obtained.

Outcome Measures

Patterns of communication were examined by classifying communication event attributes, such as the purpose of communication, the parties involved in communication, and the channel of communication.

Primary Data Analysis

Audiorecordings were transcribed verbatim, merged with the field notes, and then analyzed using coding rules that identified communication events and attributes, including the communication channel used, role of participants, and purpose of the communication.[8] Interrater reliability was 92% in identifying events and 95% to 100% in assigning event attributes.

RESULTS

Characteristics of Study Subjects

The roles of the 8 clinicians were medical registrars (senior ED clinicians), junior physicians (intern and resident), nurse shift coordinators (senior nurses responsible for coordinating activities within the study ED, with no specific patient load), and nurses with an allocated patient load. Two subjects occupied each of these roles.

Main Results

Total study observation time was 19 hours 52 minutes, in which 831 distinct communication events were identified, an average of 42 events per person per hour. Eighty-nine percent of clinicians' time was spent in communication events, with synchronous communication channels used in 84% of events. One third of events were classified as interruptions, giving an average rate of 15 interruptions per person per hour. Results are summarized in Table 2.

Registrars and nurse shift coordinators experienced the highest rates of interruption, 23.5 (95% confidence interval [CI] 18.8 to 28.4) and 24.9 (95% CI 21.9 to 27.9) interruptions per hour, respectively. Nurses with an allocated patient load and junior physicians had lower rates, 9.2 (95% CI 6.9 to 11.4) and 8.3 (95% CI 6.2 to 10.2) interruptions per hour, respectively.

Registrars spent the greatest amount of time (average 35%) and the junior physicians the least amount of time (average 17%) in interruptions. Although the nurse shift coordinators experienced high rates of interruptions, the brevity of these interruptions for each event (38 seconds) meant that on average they spent less time dealing with interruptions than registrars.

On average, the subjects spent 10% of communication time carrying out 2 or more overlapping conversations (communication multitasking), with one of the registrars involved in communication multitasking events for 17% of the observed time.

Clinicians used synchronous channels of communication, such as face-to-face communication and the telephone, more frequently than asynchronous channels, such as the medical record or request forms (Table 2). Face-to-face communication was the most commonly

Table 1.
Glossary.

Term	Definition
Communication event	Consists of a set of messages between a sending party and 1 or more receiving parties for a purpose through a communication channel
Synchronous communication	When 2 parties exchange messages across a communication channel at the same time (eg, in person or by telephone)
Asynchronous communication	When communication exchange does not require both parties to be active in the conversation at the same time (eg, writing or receiving e-mail)
Interruption	A communication event in which the subject did not initiate the conversation and in which a synchronous channel was used
Communication multitasking	A period when 2 or more concurrent communication events occurred
Patient management	Activities related to patient care, divided into direct patient care (eg, assisting patients with activities of daily living, giving medication, providing explanations to patients and their relatives) and indirect patient care (eg, documentation, organizing procedures, updating or discussing patient care with a colleague)
Ward management	Activities related to running the ward (eg, bed allocation, rosters, coordinating staff activities)
Administration	Activities of a clerical nature (eg, answering phones, transferring calls, locating medical records and patient information)
Social	Exchanges that are not directly work related; often conversations categorized as "social" will occur at the beginning or end of an interaction that had a direct clinical purpose

used synchronous channel (nurses with an allocated patient load, 86%; nurse shift coordinators, 74%; junior physicians and registrars, 72%).

Asynchronous channels were used for only a small proportion of communication events. Nurses with an allocated patient load most frequently used the medical record (11%), whereas the nurse shift coordinators used a number of asynchronous channels, in particular the Emergency Department Information System (6%) and the ward book (5%). Junior physicians used the patient medical record (10%), Emergency Department Information System (5%), and forms for ordering tests (5%). Registrars used the medical record (7%) and Emergency Department Information System (3%).

Nurse shift coordinators and registrars experienced the highest rates of telephone calls, 6.8 (95% CI 4.7 to 8.9) and 6.1 (95% CI 3.1 to 9.2) telephone calls per hour, respectively. The registrar spent the greatest amount of time communicating by telephone (14%), nearly twice that of the nurse shift coordinator (8%). Junior physicians spent 4% of their time in telephone calls, and nurses with an allocated patient load spent 1%.

The majority of interruptions were due to face-to-face conversations. Nurse shift coordinators and the registrars experienced more than double the interruptions (16% and 20%, respectively) because of telephone calls compared with the nurses with an allocated patient load and the junior physicians (2% and 8%, respectively).

Within each clinical role, patient management was the primary reason for communication, representing an average of 59% of all events and 71% of total event time. Face-to-face communication was the dominant channel for all tasks. The telephone and the computer were used most often for administrative tasks, 30% and 14%, respectively, in contrast to about 4% of patient-management tasks.

Indirect patient management was the most frequent reason for interruptions (nurses with an allocated patient load, 36%; nurse shift coordinators, 45%; junior physicians, 42%; registrars, 54%). Nurses with an allocated

Table 2.
Summary of communication events data for each subject.

Communication Event Types	RN APL 1	RN APL 2	RNC 1	RNC 2	Intern	Resident	Reg 1	Reg 2	Total or Average
Shift observed	Night	Morning	Morning	Afternoon	Afternoon	Afternoon	Morning	Morning	
No. of CEs	65	135	159	170	93	93	55	61	831
Total observation time, h:min	2:13	3:31	2:51	2:34	3:04	3:21	1:08	1:10	19:52*
Total CE time, h:min	1:47	3:02	2:20	2:32	2:45	3:09	1:03	1:01	17:40*
Time in CE, %	81	86	81	99	90	94	94	88	89
Average CE time, min:s	1:39	1:21	0:53	0:54	1:46	2:02	1:09	1:00	1:29
Median CE time, min:s	0:37	0:20	0:23	0:25	0:22	0:35	0:40	0:37	0:30
No. of interruptions	23	30	64	71	31	22	22	32	295
Total time in interruptions, h:min:s	0:20:22	0:41:00	0:31:38	0:53:48	0:27:19	0:32:39	0:19:22	0:29:10	4:15:00
Time in interruptions, %	15	19	18	35	15	16	28	42	24
Interruption events, %	35	22	40	42	33	24	40	52	36
Interruption rate, events/h	10	9	22	27	10	6	20	27	15
Average interruption event time, min:s	0:53	1:22	0:30	0:45	0:53	1:29	0:53	0:59	0:57
Median interruption event time, min:s	0:15	0:19	0:21	0:24	0:14	0:26	0:46	0:36	0:25
Time communication multitasking, %	8	11	5	11	5	14	17	8	10
Synchronous channels, %	88	87	82	89	77	75	85	84	84
Telephone conversation rate, events/h	0	1	6	8	1	1	5	7	4
Asynchronous channels, %	12	13	18	11	23	25	15	16	16
Direct PMt events, %	42	30	5	3	19	14	7	5	15
Time direct PMt, %	56	69	6	5	38	46	22	5	31
Indirect PMt events, %	36	26	42	49	55	54	46	67	44
Time indirect PMt, %	31	16	34	48	43	36	37	69	39
Ward PMt events, %	11	16	27	22	14	4	27	8	16
Administrative events, %	2	9	18	19	11	17	7	13	12
Social events, %	8	7	8	14	2	4	4	5	6
Patients/relatives as second party, %	42	34	6	5	18	13	9	8	17
Nurses as second party, %	40	35	47	61	24	27	47	30	39
Physicians as second party, %	14	8	16	22	34	39	29	39	25

RN, Registered nurse; **APL,** allocated patient load; **RNC,** nurse shift coordinator; **Reg,** registrar; **CE,** communication event; **PMt,** patient management.
*True totals when rounding taken into account. Each communication event could involve more than one purpose classification, so some proportions sum to greater than 100%.

patient load experienced the highest proportion of interruptions related to direct patient management (28%). The registrars and nurse shift coordinators experienced similar proportions of interruptions for ward management (22% and 25%, respectively) and administrative reasons (17% and 20%, respectively).

LIMITATIONS

The representativeness of the findings is limited by the small sample of subjects and shift times observed. Some roles were observed longer than others. In addition, the sampling did not capture all clinical roles found within the ED; for example, emergency consultants and triage nurses were not directly observed as the primary subject, although many clinicians were captured in the observations through their interactions with the primary subjects. Participants volunteered to be observed, which may have introduced a volunteer bias into the data. The observer's presence also may have had an effect on the behavior of study participants. However, the overall pattern of communication loads presented here for the population as a whole is similar to that reported in a previous study[4] that examined a cohort that included the ED, providing evidence that the data are a representative sample of the ED staff population.

DISCUSSION

There was a wide variation in communication loads on clinical staff occupying different roles in the ED. Medical registrars had a high proportion of interruptions (on average, 47% of all communication events) and spent much of their time dealing with interruptions (on average, 35% of their communication time). These proportions are much higher than the ED population average of 36% of events classified as interruptions and 24% of communication time spent in interruptions, which on their own have previously been sufficiently high to raise concern about the potential for generating errors.[4] These new data suggest that some clinical roles may be at higher risk of communication overload than those of the general clinical population.

Senior staff experienced higher overall rates of interruptions, perhaps because of their expertise and greater involvement in coordinating other staff and activities. The average time spent in interruptions was longer for the junior physicians and the nurses with an allocated patient load. This possibly reflects the nature of interruptions and the second party involved in each interruption. For example, the nurses with an allocated patient load experienced the greatest number of interruptions from patients. To adequately meet the information needs of patients, clinicians may spend more time providing explanations because the average patient will be unfamiliar with language and processes related to the clinical domain. Additionally, the time spent as a member of the ED team may have an effect on the length of each interruptive communication event. For example, the junior physicians on 3 monthly rotations may require additional contextual information during an interaction with another staff member, thus prolonging the time of each individual event. The shorter and more frequent nature of senior staff interruptions may conversely reflect more domain expertise and experience within the ED.

Senior staff (registrars and nurse shift coordinators) also carried the burden of telephone traffic, with registrars spending the greatest amount of time communicating by telephone, perhaps partly because certain types of calls were their responsibility; for example, calls from general practitioners seeking specialist advice about patient admission were permitted to be taken only by a registrar or consultant. Telephone call traffic experienced by nurses with an allocated patient load may be an underestimate because one of the nurses was observed during a night shift, whereas all other observations were carried out during morning and afternoon shifts.

Clinicians within the ED need to respond quickly and appropriately to circumstances,[9] and the choice of communication channel will be influenced by the purpose and urgency of the message being communicated.[10] High rates of interruptions shown in the observational data are directly related to the preference of the clinicians for synchronous communication channels, which by definition requires the attention of both parties simultaneously.[3] Building an awareness of the effect of synchronous communication on team functioning may help individuals decide whether synchronous communication is appropriate to the circumstances.[3] In general, patient and ward management issues were communicated by synchronous channels, reflecting the need for immediate feedback about changes in patient status or changes within the ED. The computer was more often used for administrative tasks than for patient or ward management, suggesting that some categories of tasks may be more suited to this medium; however, there was still a large proportion of administrative tasks being addressed through synchronous communication channels.

In Retrospect

This research was a small-scale exploratory study in which we relied on clinician volunteers. Recruiting could have been targeted to observe a broader range of primary subjects, and observing night shifts for all clinical roles would better sample the low-activity periods.

In conclusion, this study has highlighted the various communication patterns experienced by clinicians in different clinical roles. Different roles carried different communication burdens, some of which could be potentially reduced or supported through targeted organizational, educational, or technological changes. In a complex environment such as the ED, understanding communication patterns and the needs of the different clinical roles is an important prerequisite for improving ED communication processes and practices.

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