Team Composition and Perceived Roles of Team Members in the Trauma Bay

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ABSTRACT
Perceptions of trauma team members and their roles may impact team performance, requiring intervention. Participant observation and semistructured interviews were performed with trauma team members: attendings, nurses, fellows, residents, and medical students. Some team members do not include nurses as members of the team. A greater proportion of male than female team leaders perceived their role as teacher or educator. Nurses, attendings, and fellows, provided parallel descriptions of good leaders, whereas medical students and residents stressed other qualities. Inconsistencies in trauma team role definition and membership should be addressed, toward the goal of improving team communication and patient outcomes.

Key Words
Roles, Teaching, Team, Trauma

In academic teaching hospitals the medical team composition of health care providers extends beyond the traditional doctor and nurse to include the medical student, resident, chief resident, fellow, attending physician, staff nurse, charge nurse, and nurse manager. Understanding the dynamics of the players and medical team in the context of communication and clinical judgment has been of interest to researchers. Clinical teams have been studied in the intensive care unit, emergency department, long-term care setting, and operating room.

Understanding teamwork and the human factors that relate to teamwork, such as communication, supervision, seeking help, and team structure are elements that can potentially influence clinical outcomes. In the field of trauma care, teamwork is integral. It is well established that the initial assessment and resuscitation of trauma victims is most successfully carried out by an organized trauma team. Thus, despite the highly “protocolized” environment of the trauma bay, human factors may influence team structure, communication and collaboration, effectiveness during resuscitation, and leadership attributes. In previous ethnographic work specific to trauma, authors determined that culture and performance of a trauma team in the United Kingdom was influenced by human factors that included leadership, role competence, conflict, communication, the environment, and patient status. Although the authors identified important human factors through observation, perceptions of trauma team membership by the team members themselves, and the roles that team members play, are unknown.

Understanding the perceptions of different team members may have implications for team performance and suggest the need for intervention. Therefore, the goals of this study were to describe the perceptions of various members of a trauma team and to determine the roles and relationships of trauma team members.

MATERIALS AND METHODS
We used a qualitative approach to this study, including 2 qualitative data collection strategies: participant observation and semistructured interviews. The study was approved by the Institutional Review Board and carried out between August 2009 and March 2010. Trauma team attendings, fellows, and nurses were informed in detail of the study and its conduct by the study principal investigator, whereas residents and medical students were informed periodically throughout the study period at morning report.

Trauma team members were observed in the trauma bay of an academic level I trauma center for more than 300 hours. Direct and participant observations occurred during different times of a 24-hour day and different days of a 7-day week, whereas the trauma team was inactive in the bay and during trauma resuscitation. Observers took field notes with pen and paper or typed their observations directly into a word processing program on a laptop personal computer. All handwritten field notes...
were transcribed to word processing documents prior to analysis.

During the same 8-month period (August 2009-March 2010), 32 semistructured interviews were conducted with practitioners on trauma teams (attending physicians, nurses, fellows, residents and medical students). We recruited participants to achieve a balance by position, knowing that at most 8 attendings would be eligible to participate. Our final sample size was motivated by the concept of theoretical saturation (ie, when no new themes are emerging from the data). While we had the potential to interview 40 or more individuals, it was possible that we would get to a point where we would not be gaining any information by interviewing that many people. Thus, the concept of theoretical saturation identifies when new information is no longer being gained, and signifies the stopping point for recruitment, enhancing study efficiency.

Attendings and fellows were contacted in advance and their interviews were scheduled and took place in an office, to have uninterrupted dialogue. All other study participants (nurses, residents, and medical students) were approached in the trauma bay and recruited to participate in an interview. These individuals were not identified ahead of time; they were sampled out of convenience on the basis of their availability, again with the goal of reaching balance by position. Nurse, resident, and medical student interviews were conducted while they were not actively engaged in patient care, at a location in or near to the bay.

The interview questions and delivery of the interview were developed and refined through an iterative process. Interview questions were generated by M.M. and F.K.B. (principal and coinvestigator), and discussed among the study team. The interviewers, including research assistants and M.M., were trained in interview delivery, understanding of the intention of each question, and importance of consistency. Interview questions were first piloted by the trained research assistants who interviewed each other with both M.M. and F.K.B. present. After revision, M.M. interviewed a trauma surgeon with F.K.B. observing. Following the pilot interviews, final revisions were made and agreement was reached by the study team that the questions were ready for participants. Before enrolling participants, interviewers practiced the interview script with volunteers and received feedback from F.K.B.

All interviewees were asked the same set of questions. Members were asked about their roles and responsibilities as well as those of others in the team. Five questions were posed during each interview, with “probing” prompts to allow participants to fully express their views (Figure 1). Probing prompts served to elicit participant elaboration on their responses in an unbiased way. An example probe is, “Can you tell me more about what you meant by X?”

Figure 1. Semistructured interview questions posed to trauma team members.

We used a modified grounded theory approach in our analysis of the semistructured interviews and field notes from trauma team members observation. This approach consists of applying 2 forms of codes to the textual data: a priori codes that are derived from the specific research question (for example, “leadership qualities”) and grounded theory codes that represent key ideas that emerge from a close reading of the text. Once all text is labeled with codes, then each code is examined for patterns and relationships to other codes. The ultimate result is an inductively derived theory about what is in the data.

Interviews were audio recorded, and then transcribed into written documents verbatim. Transcripts were reviewed by the research team and uploaded into a qualitative research database for coding. The codes serve as labels or categories into which phrases, lines, or sections of text can be sorted. The codes then lead to themes or concepts that frame the content of the interviews. Codes were developed initially by the entire team. Each code was given a specific operational definition and was entered into a codebook contained in the software. Each transcript was reviewed independently and coded by 2 members of the research team prior to weekly meetings, where the study team reviewed the coding for consistency and agreement. If there was any unresolved inconsistencies following study team discussion, F.K.B. made the final coding decision. NVivo software version 8.0 (QSR International, Doncaster, Victoria, Australia) was used to manage the data.

RESULTS

The final sample included 32 trauma team members. A demographic profile of the participants is presented in Table 1. Attendings and fellows are combined to form the category “team leader,” so as to safeguard against individually identifiable data. Participants were nearly balanced by gender (male = 56% vs female = 44%) and the majority were white (87.5%). One participant did not provide the total years working in the field, and 3 did not indicate their age or years in the field. Figure 2 depicts that roughly equal numbers of individuals were interviewed in each position (attendings = 8, medical students = 7, nurses = 8, residents or fellows = 9).

We identified 4 primary themes. (1) Some members of the trauma team do not include nurses as members of the
Team. (2) Position on the trauma team affects perceptions of the role of teaching in the trauma team environment. (3) Gender affects perceptions of the role of educator on the trauma team. (4) Position on the trauma team affects perceptions of the characteristics that define “a good leader.” Interview quotes that pertain to some of these findings are displayed in Table 2.

Trauma Team Composition
The perceived composition of the trauma team varied by the position level (attending, nurse, fellow, resident, and medical student) of interviewees. Junior team members (medical students and junior residents) did not mention nurses when asked about team members and their roles, whereas attendings always included nurses. Nurses themselves always identified themselves as members of the trauma team. Attendings and nurses also included ancillary team members such as paramedics, chaplains, clinical coordinators, and other administrators, whereas junior team members did not. Both attendings and nurses spoke of “the big picture,” and stressed the importance of the team and the need for everyone to know their roles for a team to work well together.

Trauma Team Environment as Educational
We found that regardless of position level, the concept that the trauma team environment is a place to learn or have an educational experience was consistently reported by study participants. However, the perspectives of the education or learning varied by position level. Medical students and nurses more frequently referred to the “teaching institution” and “educational system.” They spoke of learning in an all-inclusive way, as to say the trauma team is a learning process and they learn from each other. Fellows attributed their learning directly to the teaching of attendings and did not refer to the institution or system. Attendings did not mention that they did any learning, but reported that the trauma team has an educational component.

Role as Teacher or Educator
We interviewed 5 female team leaders (2 attendings and 3 fellows) and 8 male team leaders (6 attendings and 2 fellows). Most male leaders (4 attendings and 2 fellows) spoke of their role as a teacher or educator on the trauma team, whereas only 2 female team leaders included teaching when asked about their role on the trauma team. One female team leader spoke of her need to address the educational component of trauma. She noted that it is hard to do during resuscitation, so often she speaks to the team about what they are doing on the front end and what happened on the back end of a case, a debriefing technique. Male attendings discussed their teaching role without specific examples but more globally as being part of the process to train new team leaders. Male fellows

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### Table 1: Demographic Profile of Study Participants

<table>
<thead>
<tr>
<th>Position</th>
<th>Race (n)</th>
<th>Gender (n)</th>
<th>Age Group (n)</th>
<th>Years in the Field of Trauma (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse</td>
<td>White (8)</td>
<td>Female (5)</td>
<td>20-29 y (2)</td>
<td>1-20</td>
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<tr>
<td></td>
<td></td>
<td>Male (3)</td>
<td>30-39 y (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40+ y (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unreported (2)</td>
<td></td>
</tr>
<tr>
<td>Medical student</td>
<td>White (7)</td>
<td>Female (3)</td>
<td>20-29 y (7)</td>
<td>&lt;1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident</td>
<td>White (3)</td>
<td>Female (1)</td>
<td>30-39 y (4)</td>
<td>&lt;1-5</td>
</tr>
<tr>
<td></td>
<td>Nonwhite (1)</td>
<td>Male (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team leader‡</td>
<td>White (10)</td>
<td>Female (5)</td>
<td>30-39 y (7)</td>
<td>&lt;1-18</td>
</tr>
<tr>
<td></td>
<td>Nonwhite (3)</td>
<td>Male (8)</td>
<td>40+ y (5)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Unreported (1)</td>
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</table>

‡Fellow or attending.

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**Figure 2.** Study participants by positions (total).
spoke of their teaching role in the context of what they need to do to be or become a team leader. Of the 8 nurses interviewed, none directly stated that part of their role on the trauma team is that of teacher or educator. However, when describing their role and the roles of other team members, 2 female nurses highlighted their actions as a teacher and gave examples of how they have guided or instructed junior team members. They would not teach directly, like an attending, but rather hint with body language or make “suggestions.” No male nurses alluded to their role or actions in teaching other team members.

**Definitions of “a Good Leader”**

We found that the personal characteristics used by study participants to describe a “good leader” varied by position level of the participant. Nurses, attendings, and fellows provided parallel descriptions of personal characteristics of good leaders. They included attributes such as confidence, the ability to remain calm, and respect of team members and of their abilities. Medical students and residents, on the contrary, stressed qualities such as intelligence, experience, and being good teachers.

**Participant Observation Findings**

We observed that trauma team members related differently to the patients’ reason for being in the trauma bay. For example, nurses were often interested in the patient's social situation. They were observed to be emotionally responsive, at times judgmental and at other times compassionate, when learning that a patient was under the influence of alcohol or drugs and were witnessed to be less helpful in meeting the patient's needs. Residents were also observed partaking in this “blame assessment.” Conversely, attendings and fellows were not observed to concern themselves with the reason behind the patient being there—they focused their patient interaction on technical aspects of treatment.

In addition, nurses were seen to assume ownership of the trauma bay (orderliness and patient flow) and responsibility for patient and family care. Nurses were observed discussing the mess the bay was left in by the team, and though not their responsibility they would have to restore it to its previous condition. They would discuss with one another how they would clear the bay, finding beds for everyone. The impression was given of territoriality of the bay.

Finally, we observed that waiting is a key element of the job for trauma team members. For trauma cases in which the team has been notified that a patient is on his or her way, team members prepare for the case, discuss possible injury patterns and treatment strategies, and then wait for the patient to arrive. In addition to discussing the incoming case while waiting, we also observed team members making jokes and engaging in casual conversations. Medical students were observed to be excited and nervous, whereas other members of the team displayed a more neutral demeanor. Finally, while waiting for an

<table>
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<th>TABLE 2 Quotes From Study Participants</th>
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<tr>
<td><strong>Trauma team composition</strong></td>
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<tr>
<td>“So on the trauma team you’ve got the interns in there … And then the chief residents … And then there’s the attending … The med students, the residents…” (medical student)</td>
</tr>
<tr>
<td>“… we have a dedicated airway team composed of 3 members, an EM attending, EM senior resident and a respiratory therapist … junior resident and occasionally a medical student and sometimes a senior resident depending on the circumstances. We have nurses and medics … And the team leader …” (attending)</td>
</tr>
<tr>
<td>“I think there’s a lot of autonomy in the trauma bay and great opportunities to learn and work with other members of the team, you know it really has to be a team function.” (nurse)</td>
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| **Educational environment**            |
| “… the trauma team does a good job of critiquing with the purpose of learning for the next time.” (medical student) |
| “I think it’s how you learn. This is a teaching institution and it was a good experience for me.” (resident) |
| “So even though I’ve done a lot more traumas than any of these residents, I’m still learning … and it’s a all teaching moment. You can seize that teaching moment or not.” (nurse) |

| **Role as educator or teacher**         |
| “…we have a mission to educate and I must turn over control of the team to my lieutenant so that he in turn is one acknowledged by those beneath him as a teach leader and to learn how to team lead.” (male attending) |
| “But I think the key thing of being a leader is to be able to teach by your own example.” (male attending) |
| “… I will supervise the fellow and the fellow will be the team leader but I’m responsible for sort of teaching the fellow how to be a team leader.” (male attending) |
| “Ultimately what you’re setting up is a situation as the leader as the teacher and the coach.” (male fellow) |
| “It’s very hard to do the education component during the resuscitation. So I think that the team leader becomes more effective if the team has a sort of belief that all will be revealed, all will be, that someone knows what’s going on.” (female attending) |
incoming case, trauma team members were observed to mark their territory at the bedside. The team leader stood at the foot of the bed, the nurse(s) on the right side, residents on the left, and the medical student off to the left side of the team leader. It was clear through observation that all team members had a specific position to take and that position was assumed, requiring no guidance or direction.

DISCUSSION

Perceptions of the trauma team membership, environment, and roles differ among trauma team members. In this research setting, we found that team leaders (attending and fellows) view nurses as vital, irreplaceable members of the team. Yet, we learned that medical students and junior residents did not even consider them part of the team. This finding is further complicated by the examples provided by nurses of how they have instructed or guided junior trauma team members during cases. This disconnect may be attributable to the system where medical students and residents are constantly rotating from specialties and are without a consistent model of how team leaders view nurses. Another explanation may have to do with different definitions of teamwork because of the long standing inconsistency between nurses and physicians with regard to status, authority, gender, training, and patient care responsibilities, and discrepant attitudes regarding collaboration between physicians and nurses. 19

Our study took place at an academic level I trauma center. As an academic medical center, it is expected that study participants would perceive the trauma team environment as educational. However, it was surprising to learn of the macro– versus microenvironment viewpoints of the differing team members. Medical students and nurses tended to describe a macro–learning environment in which they were learning from various members of the team and in a continuous way. Fellows more often described a micro–learning environment in which they were learning specifically from attendings toward the goal of becoming team leaders. Given that medical students are by definition students, and in the stage of continually rotating through clinical specialties, it is not surprising that they find the whole trauma team experience, rather than one particular individual, instructive. In medical team situations in academic teaching hospitals, medical students are subject to loosely defined responsibilities under constant surveillance, and are surrounded with such high expectations that being a diligent team member and knowing that other members of the team are available for instruction provides security. 20 A possible explanation for the macro–learning environment reported by nurses is the emphasis in the nursing profession on continuing education. 21,22 Continuing education may be an adopted value of nurses to the extent that they consider it part of the health system culture. 23

A fundamental role of the attending physician is that of a teacher. 24 Although most attendings in our study identified themselves as an educator when asked about their role on the trauma team, some did not. Perhaps the failure to mention their teaching responsibilities is because the role is so fundamental and basic to them. Alternatively, it is possible that additional demands, such as conducting research, grant writing, and administrative responsibilities, are in the forefront and teaching obligations have decreased. Our sample size of 13 team leaders (8 attendings and 5 fellows) is not sufficient to yield conclusive findings. Additional work in the perceived roles of attending physicians is necessary to support our data.

Our study is not without limitations. This was a single-site study that enrolled 32 practitioners in the trauma bay of an academic institution. The practices and policies at this institution may differ from other academic medical centers throughout the United States and may vary considerably from those of community-based practices. As such, the generalizability of our findings may be limited. Another perceived limitation was our sample size within team membership position. Although the sample size of this study was motivated by the concept of theoretical saturation, had we had a greater total sample size for each trauma team member position we would have been able to better characterize our findings within those positions by team member demographics, such as age, sex, and years employed.

CONCLUSION

In the trauma team setting effective health care is dependent on collaboration and teamwork among team members. We have found that there are inconsistencies in the perceived membership of a trauma team and the roles of trauma team members, which could be problematic for teamwork and impact patient outcomes. Future research should address whether educating medical and nursing personnel regarding perceived roles in the trauma bay can improve teamwork and effectiveness. Whether similar findings would be concluded in other academic medical centers or in community-based hospitals is of interest for future research.

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REFERENCES