A video analysis of intra- and inter-professional leadership behaviours within “The Burns Suite”: identifying key leadership models

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Abstract

Objective

Leadership is particularly important in complex highly interprofessional healthcare contexts involving a number of staff, some from the same specialty (intra-professional), and different specialties (inter-professional). The authors recently published the concept of "The Burns Suite" as a novel tool to deliver inter-professional and simulation-based team training. It is unclear which leadership behaviours are most important in an inter-professional burns resuscitation scenario, and whether they can be modelled on to current leadership theory. The purpose of this study was to perform a comprehensive video analysis of leadership behaviours within The Burns Suite.

Methods

Three burns resuscitation simulations within TBS were recorded. The video-analysis was grounded-theory inspired. Using predefined criteria, leadership behaviours were identified. Using an inductive iterative process, eight leadership behaviour categories/domains were identified. Cohen’s kappa co-efficient was used to measure inter-rater agreement and calculated as $\kappa = 0.7$ (substantial agreement). Each video was watched four times focusing on one of the 4 team members per viewing (senior surgeon, senior nurse, trainee surgeon and trainee nurse). The frequency and type of leadership behaviour of each of the 4 team members were recorded. Statistical significance to assess any differences was assessed using ANOVA, whereby a p-value <0.05 was taken to be significant. Leadership behaviours were triangulated with verbal cues and actions from the videos.

Results

All 3 scenarios were successfully completed. The mean scenario length was 22 minutes. A total of 362 leadership behaviours were recorded amongst the 12 participants. The most evident leadership behaviours amongst all team members were adhering to guidelines (which effectively equates to following ATLS/EMSB resuscitation guidelines and hence “maintaining standards”), followed by making decisions. Although in terms of total frequency the senior surgeon engaged in more leadership behaviours compared with the entire team, statistically there was no significant difference between all 4 members within the 8 leadership categories. This analysis highlights that "distributed leadership" was predominant, whereby leadership was "distributed" or "shared" between team members. The leadership behaviours within The Burns Suite also seemed to fall in line with the DAC (direction, alignment, and commitment) ontology.

Conclusions

Effective leadership is essential for successful functioning of work teams and accomplishment of task goals. As the resuscitation of a major burns patient is a dynamic event, team leaders require flexibility in their leadership behaviours in order to effectively adapt to changing situations. Understanding leadership behaviours amongst different team members within an authentic simulation can identify important behaviours required to optimise non-technical skills in a major resuscitation. Furthermore, attempting to map these behaviours on to leadership models can help further our understanding of leadership theory. Collectively this can aid the development of refined simulation scenarios for team members, and can be extrapolated into other areas of simulation based team training and interprofessional education.

Key words: simulation; surgical education; leadership; interprofessional education; simulation based team training; non-technical skills; teamwork

Introduction

Key leadership attributes are well-defined in the literature and in the context of surgery encompass multiple virtues which include technical competence, professionalism, motivation, innovation, teamwork, effective communication, emotional competence and teaching; these can be developed through observation, experience, and education[(1)]. Leadership is particularly important in complex highly interprofessional healthcare contexts involving a number of staff, some from the same specialty (intra-professional), and others from different specialties (inter-professional). Recently inter-professional teamwork has become an important aspect of work in health care[(2)]. Maximising patient safety and reducing medical errors depends not only upon technical expertise but also on how decisions are made, how relevant information is communicated and tasks are coordinated.

It is well-established that simulation can play a powerful role in clinical training[(3)]. Educational theory highlights the importance of contextualised simulation for effective learning[(4)]. An important aspect of surgical practice is the ability to function effectively in a setting where team members share responsibility of the patient during a procedure[(3)]. Such elements are more complex, and much harder to define than technical skills. Often they are invisible when working well, only surfacing when things go wrong. A more satisfactory conception of effective simulation may therefore highlight it as a spectrum of resources alongside clinical care in order to complement its richness. Within the appropriate context and design, simulation may therefore provide a unique opportunity to help trainees/residents develop adequate leadership skills, within the surgical environment. Simulation-based team training (SBTT) and debriefing is an evolving educational strategy that encourages work-based learning, collaboration, and teamwork[(5)]. Current SBTT programmes often include targets and feedback focused on the whole team and/or leader, ignoring the “follower” as a unique entity. Such programmes do not fully appreciate and recreate the dynamic realities and complexities of team leadership, whereby the follower is as important, or leadership is “shared” [(6)].

Dedicated simulation facilities are scarce, expensive and resource-intensive. In order to maximise the value of immersive simulation, it should be available to all those who require it. A novel, low-cost, high-fidelity, portable, immersive simulation environment (referred to as distributed simulation, or DS) has recently been developed[3]. This concept has been shown to be effective for the delivery of burns education to both surgical experts and novices within an acute resuscitation scenario, denoted “The Burns Suite” (TBS)[7]. TBS was also shown to be a novel simulation tool to deliver inter-professional and SBTT in a burns resuscitation scenario comprised of doctors and nurses[8].

Over the last decade there has been an interest in exploring leadership behaviours amongst trauma resuscitation teams[9-12] and surgeons[13-15]. Künzle et al[12] examined intra-professional leadership behaviours amongst anaesthetists within a simulated airway induction on a mannequin in the operating room. They reported the effectiveness of shared (or distributed) leadership in situations with high task complexity and indicated that a clear distribution of content-oriented and structuring leadership among team members is an effective strategy. Henrickson-Parker et al have recently published the Surgeon’s Leadership Inventory (SLI) to rate surgeon’s intra-operative leadership behaviours[13]. This was proposed following an in-depth analysis of the surgical and leadership literature, combined with data from focus group interviews with expert surgeons. They reported eight domains for the SLI: maintaining standards, making decisions, managing resources, directing, training, supporting others, communicating, and coping with pressure. Although the SLI domains primarily indicate behaviours observed in the operating room, potentially they may be explored for use in working environments such as the resuscitation room (where, although the procedure is not an actual technical operation, the behaviours required to achieve a successful resuscitation require a combination of technical and non-technical skills).

The dynamics of a team within a resuscitation scenario can be complex. It is unknown which leadership behaviours are most important and whether they can be modelled on to current leadership theory. Exploring this may inform the development of future leadership scenarios within TBS, specifically if the use of TBS were to further expand into the delivery of “non-technical skills”. Given the fact that TBS is a novel realistic simulation modality comprising an immersive portable simulation environment and authentic clinical scenario, the purpose of this study was to perform a comprehensive video analysis of leadership behaviours within TBS, in order to explore whether SBTT within TBS can elaborate on key leadership theories, and which leadership models appeared predominant within TBS.

Materials and methods

This study had approval from the Imperial College London ethics committee. Three burns resuscitation simulations within TBS were recorded using a wide angled Sony HD camcorder and were available for analysis. The inclusion criteria were 1) a complete (i.e. start to finish) scenario recording, and 2) clear audio quality requisite to capturing all communication between the burns resuscitation team. All three videos met these criteria and were scrutinised.

A total of 12 participants (6 doctors and 6 nurses) were present in the video recordings of the burns resuscitation scenario within TBS. There were 3 surgical burn experts (senior surgeon), 3 nursing burn experts (senior nurse), 3 trainee surgeons and 3 trainee nurses (the latter 6 representing novices). Their basic demographics are described in Table 1. All participants agreed to their scenarios being video recorded, and consented for their data to be used analytically for research and publication purposes.

The scenario was the same as that recently published by this group[7, 8]. It was based on a 12-year old girl who sustained a 15% total body surface area flame burn. The entire scenario involved the unique dynamic interaction that occurs between the intra- and inter-professional team, representing what happens in a real "resusc environment". On the simulation day, participants were briefed before each moulage began. They were opportunistically divided into teams comprising 2 doctors and 2 nurses, depending on who was available and "free to participate". The first author (HS) acted as the moderator/facilitator for each scenario. All participants were requested to perform their job as they would in their respective clinical settings. Debriefings post-moulage consisted of an average of 20 minutes of feedback and were video-recorded. The participants also underwent focus group interviews post-simulation; this was audio recorded and transcribed verbatim. Samples of this qualitative data have been previously published[7, 8]. As the scenario involved intra- and inter-professional colleagues, the focus of this video analysis was on identifying underlying leadership skills, domains and approaches adopted within this simulated team resuscitation scenario, mapping them on to leadership theory.

The video analysis was grounded theory-inspired, as described by Strauss[16], to examine leadership behaviours in this dynamic context. The inherent approach adopted was similar to that described by Xiao and Mackenzie[9], and Rydenfält et al[15] . Analysis of leadership behaviours of all team members was performed, focussing on verbal and non-verbal communications. Leadership behaviours identified were based on these descriptions by Yukl[17]: "... one team member influences others to accomplish goals set by either that individual or the organisation'' (p. 7) and "the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective effort to accomplish shared objectives" (p. 8). A multi-stage process ensued. Firstly, one video was carefully reviewed by two authors (HS and MS), and all actions/interactions deemed as leadership behaviours were identified. These were independently reviewed by separate authors with expertise in leadership and human factors, and agreed upon. These segments were abstracted, taxonomies developed through a recursive process, and iteratively eight main leadership behaviours identified, which were grounded in the data (Table 2). Cohen's kappa co-efficient was used to measure inter-rater agreement and calculated as $k= 0.7$ (whereby $0.61< k < 0.8$ represents substantial agreement). It can be seen that the domains we identified in our analysis are very strongly supported by and in agreement with the SLI identified by Henrickson Parker et al[13]. Each video was watched four times by one author (HS) focusing on one of the 4 team members per viewing (senior surgeon, senior nurse, trainee surgeon and trainee nurse). The frequency and type of leadership behaviour of each of the 4 team members were recorded.

Results

All 3 scenarios were successfully completed. A total of 68 minutes of video recordings were reviewed, with a mean scenario duration of 23 minutes. A total of 362 leadership behaviours were identified amongst the 12 participants in all 3 videos. Table 3 summarises the frequency of the eight identified leadership behaviours by each of the 4 team member categories (i.e. senior surgeon, trainee surgeon, senior nurse, and trainee nurse). Although it appeared that senior surgeons displayed the greatest number of leadership behaviours (146 of 362 behaviours in total), statistical analysis highlighted no significant difference between professionals ($p=0.131$).

The senior surgeon directed his/her leadership behaviours mainly towards his/her trainee, followed by the senior nurse. The senior nurse appeared to target her leadership behaviours mainly towards her trainee nurse, followed by the trainee surgeon. This could indicate that seniors (both surgeons and nurses) believe that they should principally lead their own juniors, before targeting team members from other specialties.

It can be seen that the most evident leadership behaviours amongst all team members were adhering to guidelines (which effectively equates to following Advanced Trauma and Life Support/Emergency Management of Severe Burns resuscitation guidelines and hence "maintaining standards"), followed by making decisions. Leadership behaviours such as communicating with the patient, supporting team members, and coping with pressure, appeared to be fairly equally distributed amongst the team. The most junior members of the team did not display any attempt to teach or train (each other or their seniors). The only participant to have not delegated any tasks was the trainee nurse. Table 4 expands upon the eight domains of leadership behaviour identified with examples and verbatim comments.

Discussion

This study reports a detailed video-analysis of leadership behaviours within three authentically replicated burns simulation resuscitation scenarios in TBS. The results suggest that although the senior surgeon followed by the senior nurse displayed the highest frequency of leadership behaviours, statistically there was no difference in frequency of leadership behaviours amongst participants i.e. effectively they showed a similar number of behaviours. It must be noted that frequency of specific leadership behaviours does not translate into adequacy or effectiveness of leadership. By no means can the frequencies of these behaviours be used in a summative manner to gauge the adequacy of overall leadership. In this video analysis, our aim was to better understand leadership models between seniors and juniors within SBTT and in an acute burns resuscitation scenario, by rating the type and quantity of each behaviour.

The most common leadership behaviour was adhering to resuscitation/trauma guidelines, followed by making decisions, and communication with the awake (and injured) patient. Interestingly increased focus on more difficult tasks (e.g. confirmation of burn surface area and calculating corresponding fluid volume required) during the resuscitation process, appeared to affect the senior surgeon's ability to deliver certain leadership behaviours towards his/her junior, such as training, although leadership behaviours such as delegating and supporting (nursing) colleagues was not affected.

Emotional stressors, such as appearance of the distressed mother into the moulage, prompted widespread changes to the entire leadership behaviour of the team. In two scenarios, the most senior participant (senior surgeon) took the responsibility to communicate with the mother, allowing the trainee surgeon to "step up" and continue clinical care. Both nurses ensured they continued to communicate with the burned patient and supported each other. Such behaviour can provide a sense of psychological safety that is conducive to learning and improvement[(18)].

Participating in an acute resuscitation scenario perhaps introduces more of a tense situation than an elective surgical procedure. An elective surgical procedure is planned, and if all goes well, can have a predicted start and finish time. This is in contrast to an acute resuscitation scenario, when the arrival time into the emergency department is usually unpredictable, and any deterioration can mirror an undesirable surgical emergency situation that occurs intra-operatively. It has been shown that at the "point of no return", such as a difficult aspect within an operative procedure, leadership behaviours may change to a more "directive" approach[(13)]. In a high-fidelity simulated trauma resuscitation scenario, it was shown that non-technical skills amongst surgeons and nurses deteriorated as clinical scenarios progressed, and that the performance of team leaders and teams is highly correlated[(11)].

Use of video analysis offers a unique advantage over most observational studies as careful assessment of actions can be confirmed by repeating clips, and viewed by several people[(19)]. Such detail would be difficult to recollect in interviews or to articulate in retrospective accounts when ''that moment'' has passed. In a recent ethnographic study employing video analysis of ward nurses' handover practices, Liu, Manias[(20)] described how nurses routinely communicated through non-vocal means, such as the exchange of glances or gestures. Live videos in real burn resuscitation scenarios are virtually impossible to obtain, because of issues pertaining to patient consent in such injured states within a sensitive environment[(21)], and patient identities in adjacent bays would have to be protected, which can present a technical difficulty within the dynamics of the resuscitation room. As TBS scenario was shown to feel "very real"[(7, 8)], it is hoped that the data generated can be extrapolated to future simulation exercises.

Mapping behaviours on to leadership theory

"Distributed leadership" (also referred to as "shared leadership") was evident within TBS. Leading and following are collaborative adjustment behaviours, an evolutionary strategy for solving social coordination problems[22]. When group members actively and intentionally shift the role of leader to one another as necessitated by the situation, a shared or distributed leadership occurs implying that team members must master both roles in order to positively affect the team's behaviour, cognition and effectiveness[6]. The competences, learning process and experience of both roles may also differ. It has been postulated that over time, the expansion of distributed leadership within groups is related to growth in group trust and consequently performance improvement[23].

The traditional leader-centred vertical hierarchical leadership model was not evident. On analysis at a "micro-level", we found several instances when the senior surgeon stepped down to lead his junior (by helping, guiding and teaching), whilst the senior nurse was leading her own junior and continued to do as told by the senior surgeon, repeating instructions and procedures, so that the entire team was aware of the progress that was being made. The distributed leadership perspective allows detailed study of leadership as it emerges from the dynamic adaptive behaviour of team members in emergency team scenarios, which naturally represent complex socio-technical team systems consisting of multiple professions[15]. The results highlight that different team members exercise varying contributions and frequencies of leadership behaviours, such that whilst the senior surgeon is delegating to or training his junior, the senior nurse is supporting her junior and both are communicating with the patient; in this model, this signifies that leadership in a team-based resuscitation scenario can be considered distributed, rather than continuously being associated with a specific leader (for example in this case the senior surgeon).

For leadership behaviour categories such as adhering to guidelines and supporting team members, these appeared to occur in a more collective manner. This is important because the common goal is a successful resuscitation and safety of the patient, in line with best practice guidelines. Decision- making and delegating were two behaviours seen frequently in senior surgeons and senior nurses. Their leadership primarily focussed on achieving clinical targets, and their corresponding trainee behaviours were mainly aiming to adhere to guidelines and follow instructions, whilst being helpful and supportive at all times. Asking for advice or help and "speaking up when needed" is important for safety[24, 25]. This was most evident when juniors were unsure how to proceed in the clinical scenario (e.g. the trainee surgeon was given the Parkland formula and instructed to prescribe the corresponding fluid volumes, but asked for help when he was unsure of the calculated result before he prescribed it; the trainee nurse was asked to collect and draw up analgesia; she wanted senior confirmation on the dosage before drawing it up). Handing over important information and feeding back about results (e.g. haemodynamic parameters or blood gas analyses) is related to "speaking up in order to swiftly share information with team members". Interestingly this behaviour was distributed over the entire team within TBS (i.e. both intra- and inter- professional). Speaking up has been associated with successful teamwork[18]. Distributed leadership regarding transfer of safety critical information is probably a contributory factor as to why distributed leadership has been associated with improved safety[15, 24]. A recent SBTT project reported their longitudinal data from a strategic simulation game; they explored the inter-professional collaboration between residents (medical trainees) and nurses in general internal medicine, using a qualitative approach to study behaviours enhancing teamwork quality[26]. Most resident-nurse pairs tended to interact in a traditional way, with residents "being leaders" and nurses assuming their roles e.g. executing medical prescriptions. They demonstrated different types of interactions involving shared responsibilities and decision-making. The presence of a leader within the pair or a truly shared leadership between resident and nurse contributed to teamwork quality only if both members of the pair demonstrated sufficient autonomy[26]. Interestingly another recent study explored a SBTT scenario involving medical students[27]. In the role of leader, participants experienced higher levels of concentration and mental strain than in the role of follower. This difference in mental strain suggests that the acquisition of leader behaviours, and/or leading the team, was more demanding for students, than the acquisition of follower behaviours/following the team[27].

The scenario may have evoked different leadership behaviours had there been other senior clinicians for the duration of the scenario (e.g. consultant anaesthetist or consultant emergency physician). Decisions made in the resuscitation room can impact the outcome of the patient's recovery. It is usually important that allocated team members understand the importance of being flexible and dynamic in their leadership capabilities, to step up when needed, and subsequently step down as required. From a systemic perspective, adaptability and flexibility compose efficiency, but if applied incorrectly may also result in failure[28]. Hence, leadership behaviours exhibited by all members/professions of the team are important, allowing “leadership” to be seen as a phenomenon emerging from and situated in practice, rather than a behaviour associated with a single “leader”.

Another important and recently defined leadership model must be mentioned, as the actions within TBS seem to fall in line with DAC (direction, alignment, and commitment) as described by Drath et al[(29)]. Direction is shorthand for shared direction, referring to a reasonable level of agreement in the collective about the aim, mission, vision, or goal of the collective's shared work. Alignment refers to the organisation and coordination of knowledge and work; the work of individuals and groups is generally coherent with the work of other individuals and groups. Commitment is shorthand for mutual commitment and refers to the willingness of individual members to subsume their own efforts and benefits within the collective effort and benefit[(29)].

With the DAC ontology, it is the presence of direction, alignment, and commitment (DAC) that marks the occurrence of leadership. DAC encompasses elements of an interrelated whole that enables cooperation and shared work in a collective, and represents a distillation of outcome themes in the leadership literature. The DAC framework assumes that individuals naturally behave in certain ways to produce DAC[(29)]. For example, in this analysis, the trainee surgeon might believe that direction transpires from the senior surgeon’s vision, or that the resuscitation team members can align themselves through mutual adjustment, or that commitment is best generated by shared goals (i.e. that of a successful patient resuscitation). DAC may also explain why participants behaved the way that they did; the senior surgeon and senior nurse subconsciously led their respective juniors through the scenario, whilst implementing all resuscitation guidelines; the senior surgeon and nurse also “recapped” throughout the scenario, handed over crucial information and supported each other and their trainees, to ensure their tasks and approach was aligned with guidelines and their shared goal (of a successful resuscitation); the senior surgeon and nurse also showed their mutual commitment to each other by naturally undertaking those aspects of the resuscitation that they usually do (e.g. surgeon calculates the total body surface area of the burn and assesses for other injuries, whilst the nurse draws up analgesia and takes bloods).

Limitations of this study are as follows. First of all, the 4 participants (2 juniors and 2 seniors) for each scenario were opportunistically allocated into respective moulages, depending on who was available to participate depending on their work commitments. This may have introduced an element of selection bias, albeit unlikely, as it was standardised throughout all three scenarios. There was a difficulty in blinding authors during coding of participant leadership behaviours which may have introduced an element of detection bias, although care was exercised to avoid this. By careful assessment of both senior and trainee surgeons and nurses, we were able to elicit ethnographic clues with regards to the functioning of the team as a whole within this burns resuscitation scenario. However, we acknowledge that a more complex scenario (e.g. involving airway loss, open fractures, and/or patient deterioration) would have provided additional significant difficulties and stressors to the entire team, and may have identified different responses and leadership behaviours. Nevertheless, we believe that leadership behaviours would be expressed regardless of resuscitation complexity, although different leadership behaviours may have predominated in such circumstances. Furthermore, this analysis only examined three videos. However, this included a detailed analysis of 68 minutes of data which was capable of generating strong analyses. It must be noted that these leadership behaviours were explored in a realistic representation of a burns resuscitation, as opposed to a real resuscitation. Data from two previous reports[(7, 8)] identify that this simulation experience felt extremely real, enabling participants to behave as they would in real life.

This video analysis has highlighted unique aspects of leadership behaviour within TBS which can be further explored. Future research could examine leadership behaviours in novice and senior surgeons and examine whether these may change in the presence of more senior colleagues (consultants from the same specialty and other specialties); this may affect intra-professional leadership behaviours. In addition, it would be interesting to examine leadership behaviours displayed with more complex scenarios, involving both deterioration in the patient, with both a major burn and trauma component to the injuries; this may be coupled with more junior inter-professional support (e.g. very junior nurses) or a greater number of multidisciplinary senior colleagues to examine any changes to leadership approaches. This paper did not examine team performance as such; it may be useful to assess this in conjunction with leadership behaviours in future work (e.g. using the Mayo High Performance Teamwork Scale which rates team performance based on the consistency of 16 different criteria and is designed to evaluate global team performance, and the Ottawa Global Rating Scale (OGRS) to evaluate the performance of the team leader; the scale consists of 5 nontechnical criteria and a global assessment score)[(30, 31)]. There may also be a role for the simulated patient to contribute in the assessment of participants, particularly in terms of nontechnical skills[4].

Conclusions

Effective leadership is essential for successful functioning of work teams and accomplishment of task goals[32, 33]. As the resuscitation of a major burns patient is a dynamic event, team leaders require flexibility in their leadership behaviours in order to effectively adapt to changing situations. Understanding leadership behaviours amongst different team members within an authentic simulation can identify important behaviours required to optimise non-technical skills in a major resuscitation, and can be facilitated by video-analysis. Furthermore, attempting to map these behaviours on to leadership models can help further our understanding of leadership theory. Collectively this can aid the development of refined simulation scenarios for team members, and can be extrapolated into other areas of SBTT. For surgeons to be considered effective leaders, they need to engage in professional behaviours and communicate effectively in an interprofessional context[34]. Explicit descriptions of leadership behaviours and criteria to guide observation and categorisation of leadership roles in interprofessional education are necessary. This is a promising area to follow up with further work, taking into consideration that complex clinical and leadership-based scenarios can be combined, with other non-technical skills, and be used for both training and assessment purposes.

Legend

Table 1. Basic demographics of the twelve participants.

Table 2. Leadership behaviours identified and selected through a recursive process.

Table 3. Frequency of leadership behaviours amongst the 12 participants identified in the 3 videos.

Table 4. The eight identified leadership behaviours expanded upon with examples and supporting qualitative statements.

Characteristic	Senior surgeon	Trainee surgeon	Senior nurse	Trainee nurse
Mean Age	34y	28 y	30y	23y
Sex	1 M; 2F	3M; 0F	3F; 0M	3F; 0M
ATLS- certified	All 3 (100%)	All 3 (100%)	Nil	Nil
EMSB- certified	All 3 (100%)	1 of 3 (33.3%)	1 of 3 (33.3%)	Nil

Table 1.

M= Male; F= Female; y= years old; ATLS= Advanced trauma and life support; EMSB= Emergency management of severe burns; Nil = 0%

1. Adhering to ATLS/EMSB guidelines (effectively= maintaining standards)
2. Making decisions
3. Asking for information/help
4. Communicating with patient
5. Delegating
6. Supporting team members
7. Coping with pressure
8. Training

Table 2. ATLS = Advanced Trauma and Life Support. EMSB = Emergency Management of Severe Burns

Leadership behaviour	**Senior surgeon**	**Senior nurse**	**Trainee surgeon**	**Trainee nurse**	**Total**
Adhering to ATLS/EMSB guidelines	58	33	24	15	130
Making decisions	25	14	10	7	56
Asking for information/help	13	9	8	8	38
Communicating with patient	11	10	7	8	36
Delegating	15	12	7	0	34
Supporting team members	7	7	6	5	25
Coping with pressure	6	6	6	6	24
Training	11	8	0	0	19
Total	146	99	68	49	362

Table 3. ATLS = Advanced Trauma and Life Support. EMSB = Emergency Management of Severe Burns

Leadership behaviour	Example/Action taken	Verbatim statement
Adhering to ATLS/ EMSB guidelines	Assessing airway and breathing Checking temperature and reporting parameters Manually confirming pulse	“There is no evidence of facial burn or inhalation injury” (SS) “Her temperature is 36.2 degrees Celsius” (SN) “Her pulse is 86 sinus rhythm” (27)
Making decisions	Beginning formal fluid resuscitation once burn calculated and identified as “a resusc burn” Identifying the patient is in pain and selecting two forms of analgesia for administration Applying bair-hugger to patient’s legs to keep her warm	“This is a 15% TBSA burn, let’s begin resuscitating with Hartmann’s” (SS) “She is in pain and will need morphine; I will draw that up” (SN) “I will put this on her legs to keep her warm if that is OK” (TN)
Delegating	Physical tasks (e.g. to prevent heat loss from patient) Verbal tasks (e.g. to help plan surgery) Combination tasks	“Can you wrap those in cling films please” (SS) “Can you get me another cannula, syringe and flush please? (SN) “Find out when she last ate or drank” (SS) “Did you check whether she has any bruises? (SN) “Please connect the bag and then read those results out to me ” (SS)
Training	Senior surgeon towards trainee surgeon, explaining the importance of accurate assessment to avoid over- or under- resuscitation Senior nurse towards trainee nurse, when unsure why the senior surgeon requested	“You can see that she is a 15-20% burn on the hand rule, but let’s confirm with the Lund-Browder chart... because we need to ensure we don’t make a mistake.. (SS) “We need to get another line because she needs pain relief through one and

	further intravenous access	fluids through the other” (SN)
Communicating with patient	Engaging with the patient to elicit further history Addressing patient’s concerns/requests Reassuring the patient	“Hannah, do you remember what happened? Can you tell me?” (SS) “Can you stop talking and call my mum? (P) “We’re just waiting for your mum to come sweetheart, OK” (SN) “You’re doing very well, you are being very brave” (TN)
Asking for information/ help	In order to guide further decisions/actions, requests supplementary information (blood gas parameters in this case) taken by someone else Uncertainty of the correct balance of allowing the team to assess the burn versus keeping the patient warm and comfortable Uncertainty of the correct aspect of the formula to use (i.e. wither the co-efficient of 2mLs per kilogram per TBSA should be used, or 4mLs, should be used)	“Did you say you got the gas? What were the results” (SS) “Do you think we should cover the burns on the legs which might make her relax?” (TN) “I will use the Parkland formula on this sheet. But shall I use the 2 or 4 mLs to calculate the fluid requirements?” (27)
Supporting team members	Sharing equipment Re-capping data and current information	“Can I have that stethoscope to listen to her chest” (SS); Of course” (27) “So remind me what analgesia has she had so far? Has she had morphine?” (27) “She’s had no morphine. No she has had intranasal diamorphine and paracetamol, and she’s still in pain” (SN) “OK let’s give her intravenous

	Providing "clinical backup" to help members make decisions	morphine please" (27) "OK will do that now" (SN) "So when her mother arrives, I will need to update her. Please continue to do the necessary and let me know if there are any problems.." (SS)
Coping with pressure	Addressing patient concerns particularly when she is very worried (demanding her mother), and her oxygen saturations dropping, and the senior surgeon stepped out to contact the anaesthetist Trying to calculate fluid requirements (when required to "step-up") but struggling to get the calculation quickly, with the patient crying she wants her mother, and the pulse oximeter is making beeping noises Highlighting minimal clinical experience, but ready to help, in the context of a difficult scenario	"Hannah sweetheart, please stay calm, everything will be OK, your mother is on her way (TN) "Just relax please, the doctor is just calculating your fluids" (SN) "Yes Hannah, I am trying to do this as soon as I can, really sorry" (27) "Am really sorry I am one of the student nurses, I don't know how to do anything so please bear with me.... I will do my best (TN) "OK can you please put out a trauma call 2222 and tell them I need help here please" (SS)

Table 4. SS = senior surgeon; SN = senior nurse; TS = trainee surgeon; TN = trainee nurse; ATLS = Advanced Trauma and Life Support; EMSB = Emergency Management of Severe Burns

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