Descriptions of verbal communication errors between staff. An analysis of 84 root cause analysis-reports from Danish hospitals

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Introduction: Poor teamwork and communication between healthcare staff are correlated to patient safety incidents. However, the organisational factors responsible for these issues are unexplored. Root cause analyses (RCA) use human factors thinking to analyse the systems behind severe patient safety incidents. The objective of this study is to review RCA reports (RCAR) for characteristics of verbal communication errors between hospital staff in an organisational perspective.

Method: Two independent raters analysed 84 RCARs, conducted in six Danish hospitals between 2004 and 2006, for descriptions and characteristics of verbal communication errors such as handover errors and error during teamwork.

Results: Raters found description of verbal communication errors in 44 reports (52%). These included handover errors (35 (86%)), communication errors between different staff groups (19 (43%)), misunderstandings (13 (30%)), communication errors between junior and senior staff members (11 (25%)), hesitance in speaking up (10 (23%)) and communication errors during teamwork (8 (18%)). The kappa values were 0.44−0.78. Unproceduralized communication and information exchange via telephone, related to transfer between units and consults from other specialties, were particularly vulnerable processes.

Conclusion: With the risk of bias in mind, it is concluded that more than half of the RCARs described erroneous verbal communication between staff members as root causes of or contributing factors of severe patient safety incidents. The RCARs rich descriptions of the incidents revealed the organisational factors and needs related to these errors.

INTRODUCTION

Patient safety is still a major problem at many hospitals all over the world. Poor teamwork and communication between healthcare staff are correlated to patient safety and adverse events.[1] Team training[2] and standardising of verbal communication[3] have been suggested as methods to improve staff communication and thereby patient safety. However, the existing descriptive studies of hospital staff communication have been labelled as non-exhaustive and failing to reveal the systemic factors leading to the event. This inhibits the ability to suggest appropriate interventions.[4] It has therefore been recommended to add depth to the studies of communication error by exploring the objectives, communication tools, community affiliations, rules and division of labour for all the individuals involved in the patient care team.[5]

A root cause analysis (RCA) (for definitions, see table 1) uses human factors thinking to analyse the causes of a severe patient safety incident and actions necessary to prevent its recurrence.[7]

The method originates from aviation and was given a platform in healthcare by the Veterans Affairs National Center for Patient Safety[8] and The Joint Commission of Health Care Accreditation.[9] It is a systematic interactive process following a prespecified protocol and performed by a multiprofessional team whereby the sequence of events and the organisational factors that contributed are identified. The result is a detailed report (RCAR) based on the incident report, the pertinent written medical documents, interviews with involved staff members, human factors thinking and consensus that describes communication, environment, training and competencies, equipment, safety barriers, procedures and guidelines

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Table 1 Terms used in the article, definitions and examples from root cause analyses reports included in the study

Term	Definition	Examples (no referring to table 3)
Root cause	The most fundamental reason for the failure or inefficiency of a process that—if eliminated—most likely would prevent the event[6]	
Contributing factor	A circumstance, action or influence which is thought to have played a part in the origin or development of an incident or to increase the risk of an incident[6]	
Communication error	Missing or wrong information exchange or misinterpretation or misunderstanding[6]	1
Verbal communication error between staff	Missing, wrong, misinterpreted or misunderstood verbal information between staff members	43
Handover error	Missing, wrong, misinterpreted or misunderstood verbal information between staff members in relation to handover (for instance sign-off or transferral)	23
Communication errors between staff members from different staff groups	Missing, wrong, misinterpreted or misunderstood verbal information between staff members in different staff groups (doctors, nurses, etc)	32
Misunderstanding	Misconception of patient information (for instance because of back ground noise, sound-alikes, language difficulties or speech impediments)	26
Communication error between junior and senior staff members	Missing, wrong, misinterpreted or misunderstood verbal information between staff members at different levels	28
Communication error due to hesitance to speak up	Situations were staff members have concerns or possess information but hesitate or refrain from speaking up due to confusion, respect for authorities or intimidation	2
Communication errors in teams with more than two members	Missing, wrong, misinterpreted or misunderstood verbal information between staff members in a group of more than two more staff members	36

related to the incident.[7] The RCA method can thereby contribute to the broader look at communication factors that is being called for[4][5] and which is lacking from individual interviews and analysis of incident reports, for instance.[10][11] Furthermore, it has the explorative approach that is lacking from observation studies[12] and questionnaires.[13]

Despite the disseminated use of RCAs in American, British and Australian healthcare systems among others,[14−16] there are few indications hereof in the literature.[17] This might have to do with confidentiality issues or the bias-issues related to the RCAs. The latter will be addressed in detail in the Discussion section.

When developing a team training programme, an assessment of the needs at organisational, team and individual level is necessary.[18] We speculated on whether RCARs could be used to explore the organisational needs for verbal communication support. The objective of this article is therefore to review RCARs for descriptions of verbal communication between staff as a part of a needs assessment before developing a team training programme to strengthen patient safety.

METHOD

Accessing and selecting reports for this study

Hospitals in the Capital Region of Denmark began conducting RCAs in 2001.[19] After adjustments, the method was considered stable in 2004. From 2004 to 2006, 94 RCAs were completed at six hospitals in the organisation. Reports conducted after September 2006 were excluded from this study, as they had the risk of being influenced by increasing focus on communication errors in the organisation.

According to Danish law, the reports are considered documents related to organisational development. As the reports do not contain data identifying the patient, involved staff or the RCA team, they can be accessed for patient safety purposes after permission from The Unit for Patient Safety, The Capital Region of Denmark. This permission was obtained before including the reports.

A pilot analysis on 10 RCARs selected at random was conducted to calibrate the data extraction between reviewers. These reports were excluded from the final data set. This left a total of 84 RCARs, which all included

a narrative of the sequence of events, a description of standard operating procedures, root causes and/or contributing factors, as determined by the RCA team and a description of the actions to prevent recurrence.

Extracting data from included reports

Two researchers (LIR and MLA) with substantial experience in rating patient safety incidents independently analysed the event, root causes and contributing factors in the 84 RCARs for descriptions of verbal communication error between staff as causing or contributing to the patient safety incident or near miss. Reports with full inter-rater agreement hereupon were further analysed for the following predefined characteristics:

1. Was there any description of verbal communication errors in relation to handover (eg, sign-off or transferral)?[20]
2. Were there any descriptions of misunderstanding?[21 22]
3. Were there any descriptions of verbal communication errors between staff members in different staff groups?[23 24]
4. Were there any verbal communication errors between junior and senior staff members?[24 25]
5. Was there any failure to speak up?[18 23]
6. Were there any descriptions of verbal communication errors in a group of more than two more staff members?[26 27]

The selection of the above characteristics was based on suggested mechanisms of patient safety incidents and suggested methods to improve verbal communication (see the respective references). After independent analysis, the ratings were disclosed, comparisons were made, and κ coefficients were calculated.[28] This was followed by an exploratory review of the RCARs where characteristics of the above verbal communicative challenges were identified. The excerpts characterising the incidents were extracted and translated from Danish to English and inserted in table 2.

RESULTS

The raters agreed upon a description of verbal communication error between staff in 44 (52%) of the 84 reports (κ 0.56). These reports stated a median of two root causes (range 0−7) and one contributing factor (range 0−5) per case. All teams included leaders competent of implementing the suggested actions and consisted of a minimum of three different staff groups. In 42 (95%) of the RCARs, frontline staff were part of the team.

The two raters found a description of handover errors (loss of information at sign-out or transfer) in 35 reports (86%) (κ 0.66) (table 3), communication errors between different staff groups in 19 reports (43%) (κ 0.71), misunderstandings in 13 reports (30%) (κ 0.61), communication errors between junior and senior staff members in 11 reports (25%) (κ 0.44), hesitance to speak up in 10 reports (23%) (κ 0.78) and communication errors in teams with more than two members in eight reports (18%) (κ 0.73).

The exploratory review revealed that the incidents occurred where the communication was unproceduralised (31 cases (table 2, eg, nos 12, 13, 14, 16)). Communication was particularly vulnerable when transferring patients between departments or hospitals (11 cases, eg, table 2, nos 6, 8, 21, 41) or when involving other specialties (for instance during consults) (10 cases, eg, table 2, nos 14, 19, 23, 24). Exchange of information was challenging when it relied on telephone conversation (17 cases, eg, table 2, nos 8, 30, 44).

DISCUSSION

Error in verbal communication between staff was described in more than half of the cases as a factor causing or contributing to severe patient safety incidents. Communication error in relation to handover was the most frequently described characteristic. This is in agreement with others.[20] Handovers were particularly risky when there were no procedures for communication between staff, when patients were transferred between departments or hospitals, when information was exchanged between specialties or when the information exchange was conducted via telephone. These aspects of staff communication were previously not well described. This might be explained by the fact that other methods used in the field (mainly observation and interviews) often only describe communication related to one group or setting.[10 12 13] The RCA method allows uncovering of communication weaknesses in relation to organisational procedures, barriers, equipment, training and environment, and as such it fills the need for a deeper understanding of healthcare communication.[4 5]

Communication errors between different staff groups were frequent as well. This can indicate that the different staff groups have different agendas for the patient which can lead to misunderstandings or are trained to communicate differently.[29] However, it probably also indicates that communication between nurses and doctors accounts for a large proportion of hospital communication. In any case, our results indicate that the process needs attention during teamwork and communication training.

In contrast to previous findings, our analysis could not confirm a strong hierarchy and failure to speak up as a major cause of communication errors.[24] This can

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Table 2 Excerpts from the 44 reports with inter rater agreement on verbal communication error(s) between staff members

No	Event	Excerpt from root cause analyses reports wording (translated from Danish)
1	Inpatient suicide	'Information from the contact person was found in the nursing chart but not in the medical chart. (…) The contact person was not informed when the patient was offered leave.'
2	Unexpected cardiac arrest	'During the procedure, the patient becomes increasingly broncospastic. The nurse asks both doctors several times to withdraw the scope (…) but gets no response.'
3	Call for help to patient in distress	'The technician paged the resident. The resident never returned the call. The technician went for help in the corridor but found no one there. (…) The [other] nurse thought the patient in distress was a patient waiting in the corridor.'
4	Low stock of intravenous fluids	'Because the message about the product being out of stock and new supplies not delivered was verbal (…) the risk of the product being out of stock was increased.'
5	Inpatient suicide	'The patient was transferred from closed to open psychiatric unit which increased the risk of continuity problems (…) The written information was comprehensive and did not describe the staff members concerns about the patients' suicidal risk.'
6	Unexpected cardiac arrest	'At sign-out on the fifth day after admission, it was not made clear that the condition had deteriorated during the night shift. The patient saturated [insufficiently] and was in respiratory distress (…) The sedative treatment was continued.'
7	Unexpected death	'The way the nurse verbally communicated that the patient needed to be seen, made the physician think it could wait.'
8	Medication error	'The treatment plan [for this specific condition] was usually made during morning rounds. The [lab] result was not available until later that day. The night-nurse saw the result and called the resident, but no decision was made and the patient did not receive [this specific] treatment.'
9	Unexpected cardiac arrest	'A patient arrives to the ER after intake of [a high number of] tablets. Normal procedure is that all patients with poisonings are seen by an anaesthetist. The anaesthetist was occupied by another acute procedure. During telephone conversation between the ER nurse and the anaesthetist it was not made clear that the dose was lethal. The patient was transferred to the general medical ward and the anaesthetist expected to be paged if the patient needed further attention.'
10	Patient suicide during furlough	'If the verbal and written communication between the districts had been sufficient, the medication would most likely not have been delayed and cancelled.'
11	Inpatient suicide	'After every [of the numerous] operation[s] the young patient was discharged to the shelter. (…) There was no contact between [staff at] the unit and [staff at] the shelter.'
12	Unexpected cardiac arrest	'[There was] no communication between doctors on duty. (…) No one carried the prescribed tests for anaemia out. (…) There was no joint treatment plan. (…) No one saw the test report as it was sent to another unit.'
13	Wrong-site anaesthesia	'The senior doctor was not in the room during the patient identification process. (…) The two doctors [did] not communicate about the site.'
14	Unexpected cardiac arrest	'The diagnostic procedure was ordered "when opportunity arises." (…) The diagnosis dragged on because of communication errors between the units'
15	Unexpected cardiac arrest	'…this [information] was not heard by the physician. (…) Information was lost, and the involved physicians did not have precise agreements. (…) The team lacked a joint unequivocal plan for the procedure.'
16	Death after elective operation	'The surgeon's handover was too brief. (…) The chart note was too brief to assess the patient's status. (…) There was no consensus in the team about the procedure. (…) Coordination of the procedure relies on good communication. This was absent in this case.'
17	Inpatient suicide	'Because of busyness in the receiving unit there is no verbal communication during handover regarding the patient's status.'
18	Lack of anaesthetic during procedure	'Because there was no clear-cut communication at the beginning of the procedure (…), the risk of misunderstandings was increased.'
19	Delayed treatment	'The communication between [doctor A] and [doctor B] was not optimal. This induced insecurity about the (…) treatment. (…) [Doctor A] misunderstood the purpose of the call.'
20	Delayed treatment	'The resident assumed that the patient would be transferred and did therefore not inform the internist about the patient in the ward'
21	Delayed treatment	'The diagnosis was not described sufficiently in the chart and called for verbal explanation. (…) A combination of work load and communication errors caused the patient to wait for hours before admittance.'
22	Delayed treatment	'There were no uniform guidelines for nurse–doctor communication after a patient fall. (…) This can result in delayed treatment.'

Continued

Table 2 Continued

No	Event	Excerpt from root cause analyses reports wording (translated from Danish)
23	Delayed treatment	'Because of problems with overcrowding, the patient was transferred from one unit to another after admittance (…) but the doctor at [the new] unit was not informed (…) The patient was not mentioned at sign-out as it was expected that the patient could be discharged (…) and (for the same reason) a specialty was not decided for the patient (…) The patient was not registered in the electronic system.'
24	Postoperative cardiac arrest	'The doctors in the team did not agree on the diagnosis, the severity of the condition or the plan.'
25	Delayed treatment	'There was no clear-cut communication path to make sure the decisions from the two medical teams (…) were communicated and documented in all instances and at all times. (…) The decision was only recorded in the nursing record and communicated verbally to the doctor.'
26	Failure during oxygen therapy	'The nurse thought the doctor heard the message, but wasn't sure.'
27	Medication error	'The doctor and the nurse used different criteria for evaluating the condition.'
28	Delayed treatment	'The on call-doctor did not find it necessary to see the patient even after several telephone consultations with the intern.'
29	Medication error	'The factor 10 insulin overdose was not communicated to the doctor on duty (…) as the insulin was not considered a potent drug.'
30	Medication error	'The room was sealed [to reduce risk of infection] and staff therefore had to rely on telephone communication. (…) The nurse and the inexperienced doctor did therefore not ask a senior colleague for help when in doubt about the right dose.'
31	Cancelled operation after anaesthesia	'To save time (to catch up on the operation programme) the anaesthesiologist started the anaesthesia before the surgeon was present to re-evaluate the indication.'
32	Error during preadmission evaluation	'The information about the patient provided by the ambulance staff left the receiving doctor with the impression that the patient wasn't critically ill.'
33	Delayed treatment	'Because there were no established procedures for communication between the two units, the x-ray report was not discussed.'
34	Suicide during leave	'During readmission the patient was admitted to another unit. (…) By admitting the patient to a different unit, there is a risk of loss of information between the two staff groups. (…) The doctor at the second unit was unaware of this specific information.'
35	Complications after use of medical device	'Because there were no procedures or communicative pathways for discussion of routines or quality and safety, the risks of initiating or continuing potentially hazardous treatments were increased.'
36	Complications during CPR	'[When the alarm sounded] approximately 15 people showed up in the relatively small room. For some of the staff members present it was unclear who was in charge of the resuscitation. (…) There were five doctors present (…) However this did not lead to any discussion of who was in charge.'
37	Delayed treatment	'The involved parties did not know who was responsible for the procedure. New team members were thus not informed about the [important clinical information]. (…) If communication about trauma patients isn't systematic and there is no apparent team leader, the risk of loss of valuable information is increased and diagnosis can be delayed.'
38	Suicide during leave	'When transferring patients to lower levels of care, there is a risk of loss of relevant information and downplay of symptoms. (…) During the meeting the nurse expressed concern for the patient and the transfer. This concern was not documented in the chart.'
39	EMR-recovery error	'The dispatcher could not call all the users. (…) If communication routines are established after a pilot test with few users and not from a test including the full number of users, the risk of establishing insufficient communication pathways is imminent.'
40	Complications to treatment	'The condition was not immediately recognised, as there was no systematic communication or documentation of information regarding the problem.'
41	Postoperative complications	'The [procedure] was ordered electronically but not executed before the patient died as there was no communication between the ordering doctor and the radiologist. The procedure could therefore not be completed as an urgent case.'
42	Failure to resuscitate	'The nurse aid was late for the briefing and did not hear that [she/he] was the contact person for the patient. (…) The patient was thus not observed until lunch time'
43	Errors during preadmission evaluation and transfer	'Several professionals were involved [in the transfer]. This increased the risk of no final decision being made. It was furthermore unclear who the team leader was during trauma-handling. This increased the risk of internal and external misunderstandings of information.'
44	Delayed diagnosis	'[During telephone communication] the doctor got the impression that the patient could be transferred to and admitted at the [other] hospital. [This was not the case].'

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Table 3 Eighty-four root cause analyses reports (RCARs) where analysed

RCARs describing verbal communication errors (N=44)	Frequency	Percentage	Kappa (CI)
Handover errors	35	86	0.66 (0.43 to 0.90)
Communication errors between different staff groups	19	43	0.71 (0.49 to 0.92)
Misunderstandings of verbal orders	13	30	0.61 (0.33 to 0.89)
Communication errors between junior and senior staff members	11	25	0.44 (0.09 to 0.79)
Failure to speak up	10	23	0.78 (0.55 to 1.00)
Communication errors in teams with more than two members	8	18	0.73 (0.44 to 1.00)

The two raters agreed on verbal communication errors in 44 RCARs. The table shows the frequency of the non-exclusive verbal communication error subcategories and kappa values.

indicate a different culture in Danish hospitals compared with other cultures. As this could mean a limited effect of assertions tools, which aims at enabling staff to speak up, further analysis is needed to confirm this.[18]

The study has helped to clarify the need for intervention. In order to support teamwork and communication, the organisations need to provide staff knowledge, skills and attitudes about safe information exchange especially during handover, information exchange via telephone, between staff groups and specialties. In a human factors perspective, this will have a larger effect if supported by standardised techniques and checklists.[21 30 31] However, targeting staff alone will be insufficient: as these data indicate, a lack of organisational procedures and guidelines establishing who communicates what to whom and when affects patient safety. Establishing and implementing such procedures will increase the chance of team and communication training success.

Except for the findings about hierarchy, which might be a mainly Scandinavian phenomenon, the findings might be applicable to hospitals in general. Healthcare is becoming more complex, and few organisations have the necessary procedures in place to account for this.[32]

The validity of the review is underscored by the fact that all RCA-teams were multiprofessional, all teams included local leaders, and nearly all had frontline staff members in the teams.

Based on these results, and the fact that RCARs are widely available in many healthcare organisations, we recommend including RCARs in needs assessments for communication and team training curricula and—where necessary—review organisational procedures and guidelines.

Methodological considerations

Hindsight bias is the major risk factor when working with RCARs: the RCA team focuses on understanding the systemic factors leading to the decisions and actions of the staff members involved but has no direct observations of the event. The analysis relies on frontline staff's memory and written records. And because the analyses are uncontrolled, a verification of the conclusion is difficult.[33] The conclusions can further be influenced by leading team members. In this study we therefore excluded studies from late 2006 and onwards, as these had a risk of being influenced by new communication tool agendas.

A second important bias is the risk of confirmation bias: it is easy for both RCA team and reviewers to conclude that an incident could have been prevented with improved communication.[4] In this study, this effect was attempted limited by letting two independent reviewers rate the RCARs and select relevant excerpts for others to interpret (table 2). Kappa values between 0.44 and 0.78 show moderate to substantial agreement between the raters extracting the data. However, the 'less-than-perfect' value can be explained by the fact that the original purpose of the RCARs was local use: the exact nature of some involved units and the experience of involved staff members were often described knowingly. Furthermore, details about ancillary services and paraclinical specialties were often excluded. If RCARs are to be systematically reviewed for quality and research purposes, thorough descriptions of organisational details must be included, along with a description of the discussions that took place in the team: what causal relations were considered by the team but rejected, and why? This will increase the validity of RCARs.

Finally, there is the problem of selection bias: the selected RCARs are not representative of all patient safety incidents. In the Capital Region, approximately 1% of the reported incidents are considered severe or frequent enough to consider a RCA. Of these, approximately 50% undergo RCA. The numbers are therefore not absolute but can serve as input to a priority list for future patient safety interventions.

The most important strategy to limit the influence of all three bias types, to uncover needs at individual, team and organisational level, and reveal both quantitative and qualitative aspects, is the use of the mixed method design.[34] In this case, the RCAR review can for instance be supplied by staff interviews, direct observation and analysis of cultural surveys.

CONCLUSION

More than half of the included RCARs described erroneous verbal communication between staff members as root causes or contributing factors. Loss of information during handover and between staff groups was described as the most frequent characteristic of the incidents. The related organisational factors were lack of communicative procedures during transfer, telephone communication and involvement of other specialties. With the risk of bias in mind, it is concluded that RCARs holds rich descriptions of patient safety incidents that allows outsiders to gain insight into organisational factors leading to the events.

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Notes