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Simulation-based team training works

PERSPECTIVES

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Training of interprofessional teams with the aid of simulation methods is used especially in preparation for medical emergencies. There is now good evidence of the importance of such training for patients.

On 27 March 1977, the world's worst ever aviation disaster, which claimed the lives of 583 people, took place on Tenerife when two jumbo jets collided at the airport in dense fog. The disaster investigation pointed to inadequate communication and misunderstandings as the likely main causes of the incident (1). Until this day it is still hard to grasp that this could occur despite all the technical aids that were available. Increasing insight into the factors

contributing to adverse events shows that we need to focus more on the people working within these systems and on how we relate to each other and to risk, rather than have blind faith in technical systems (2).

Non-technical skills

For many years, the importance of good cooperation, clear communication, unambiguous leadership and decision-making ability have been acknowledged by the aviation industry, which tends to refer to these as 'non-technical skills' (3). This also includes the ability to develop shared mental models and perceive a situation in the same way as other team members (4, 5). All airlines regularly undertake so-called 'crew resource management' training, which includes practising the use of such skills to deal with emergencies. The objective is to effectively make use of all available skills in the team to achieve the best possible outcome and prevent personal injuries and material damage.

Costs

Although there is no unequivocal evidence for the preventive effect of such kinds of team training in aviation, the training nevertheless takes place regularly. For more than twenty years, Norwegian hospitals have undertaken similar team training to better enable their emergency teams to handle challenging situations (6). The costs associated with this training are considerable, primarily in terms of the participants' working hours. A key objection has been the lack of research results demonstrating the effect of such collaboration training and thereby justifying the resources used. Now, however, the results of numerous studies show that team training results in improved patient care. This has been summarised in a number of review articles (7–9) and several publications report a clear effect on patient survival (10–18).

Effect on treatment

Postpartum haemorrhaging in the mother can be lethal. Especially in parts of the world without good-quality transfusion services, this can be a significant cause of maternal mortality (10). A study undertaken in Stavanger compared the need for blood transfusions in cases of severe haemorrhaging prior to and after the personnel had participated in a six-hour interdisciplinary and scenario-based team training session in the handling of such situations (11, 12). More than 1 000 deliveries were included in the study. The proportion of postpartum women who received blood transfusions after an estimated blood loss of 500 ml was nearly halved – from 21 % to 12 % (12). The group found a similar decrease in the number of transfusions in a study undertaken in Tanzania (11), where a similar, brief simulation-based intervention had been conducted.

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A doctoral thesis from the University of Southern Denmark investigated outcomes for severely injured patients at the Odense trauma centre. Since 2004, this hospital has held regular training sessions for its trauma teams. The study showed that the likelihood of patient survival was significantly higher when the team members were experienced and/or had participated in interdisciplinary team training (13). Experience is accumulated over time, but team training may compensate for less experience among team members. These findings tally with equivalent studies from the USA (14).

Stroke is one of the main causes of morbidity and mortality globally. Rapid thrombolytic and/or endovascular treatment is crucial to achieve the best possible patient outcome. Stavanger University Hospital has succeeded in reducing the average door-to-needle time from 30 minutes to 13 minutes, with a subsequent reduction in 90-day morbidity and mortality (15). In all likelihood, this is due to interdisciplinary quality improvement efforts, a key feature of which has been regular team simulations in the emergency room.

A study from a Dutch intensive-care unit described the effect of team training in the department over a period of three years, before and after the team training of the entire staff. After the training, the incidence of cardiac arrest fell to a third of the pre-training level. In the same period, the survival rate increased from 19 % to 55 % (16). The number of adverse events also declined significantly. Similarly, an American study has shown that younger doctors who had undergone simulation-based training in advanced cardiopulmonary resuscitation provide better treatment to patients with cardiac arrest (17).

Economic effects

The Royal Hospital for Sick Children in Edinburgh undertook a controlled introduction of emergency teams and weekly training for these teams in its departments (18). The training cut the time needed for activation of the teams and reduced the number of admissions to the intensive-care department. The authors estimated the cost of the training at GBP 74 000 (NOK 876 767), while the savings in terms of reduced use of the intensive-care unit were estimated at GBP 801 000 (NOK 9 490 408). The authors observed a parallel drop in hospital mortality from 2.9 to 1.4 deaths per 1 000 admissions. Similar findings were made in the low-income country of Tanzania, where simulation-based training and maintenance training in resuscitation of neonates was highly cost-efficient: NOK 2 211 per life saved and NOK 38.50 per year of life gained (19).

Documentation

All these studies conclude that team training has a positive effect on patient treatment and outcome. For several years, many Norwegian hospitals have run regular training sessions, both for their trauma team and other emergency teams. This started in four local hospitals (20). The professionals involved have themselves transferred the training method from severe trauma to other emergencies, such as stroke, sick neonates and acute conditions in children. Recently, colleagues at Oslo University Hospital showed that treatment of sepsis can be undertaken more quickly if the reception is organised in teams (21). Since 2017, regular training of trauma teams has been mandatory in the national trauma plan, which has been endorsed by all four regional health authorities (22).

Organising team training

We frequently hear our colleagues claim that it is difficult to organise team training in a busy everyday situation. Lack of resources, dedicated professionals and skills in managing such exercises are the most frequently cited reasons. This concurs with the results from a study that we undertook some years ago, where we investigated the factors that were important for successful team training in a department (23). One significant finding was that hospitals where the trauma committee or others with responsibility for organising training sessions were directly subordinate to the management and not far down in 'the line' had a greater chance of success.

> ***«The objective is to make use of all available skills in the team to achieve the best possible outcome and prevent personal injuries and material damage»***

In addition to a scarcity of resources and dedicated professionals, the third cause of failure to undertake team training was the need to have personnel with skills as team training facilitators. These skills are different from the traditional role of instructor (Table 1). Facilitator training is now underway in all health regions, and there is growing interest in such training courses. Over time, a growing number of departments will thus acquire the necessary competence. Also in this area, research and experience indicate that collaboration across departments and institutions enhances the chances of success (23).

Table 1

Traditional role perceptions of instructors vs. facilitators

Instructor	Facilitator
The instructor is at the centre	The participants are at the centre
Speaks a lot	Speaks little
Follows the schedule for implementation	Pursues learning goals
Evaluates the participants	Lets the participants evaluate themselves

Instructor	Facilitator
Guides the process overtly	Guides the process covertly
Keeps the cards close to their chest	Lets everything out in the open
Focuses on correcting errors	Focuses on bolstering the participants
Looks for errors to improve	Looks for strengths to reinforce

Training and practising non-technical skills, shared mental models and 'crew resource management' across disciplines and professions have been transferred and adapted from aviation to the health services with documented effect (24). The challenge now is to define those areas of the health services where this can be used to advantage and to implement the training in such a way as to make it a regular and mandatory part of normal work, for aircraft crews and trauma teams alike.

If we can achieve this, it will be less likely that future reviews of adverse events in the health services will reach the same conclusion as the air accident investigation commission in Tenerife.

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