

Improved Staff Procedure Skills Lead to Improved Management Skills: An Observational Study in an Educational Setting

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Abstract

Introduction: Good staff procedure skills in a management group during incidents and disasters are believed to be a prerequisite for good management of the situation. However, this has not been demonstrated scientifically. Templates for evaluation results from performance indicators during simulation exercises have previously been tested. The aim of this study was to demonstrate the possibility that these indicators can be used as a tool for studying the relationship between good management skills and good staff procedure skills.

Hypothesis: Good and structured work (staff procedure skills) in a hospital management group during simulation exercises in disaster medicine is related to good and timely decisions (good management skills).

Methods: Results from 29 consecutive simulation exercises in which staff procedure skills and management skills were evaluated using quantitative measurements were included. The statistical analysis method used was simple linear regression with staff procedure skills as the response variable and management skills as the predictor variable.

Results: An overall significant relationship was identified between staff procedure skills and management skills ($p \leq 0.05$).

Conclusions: This study suggests that there is a relationship between staff procedure skills and management skills in the educational setting used. Future studies are needed to demonstrate if this also can be observed during actual incidents.

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Introduction

A prerequisite for good performance in a management group is that the work is performed in a structured way. In emergency management, as well as in military training, it often is mandatory for persons in decision-making positions to participate in training on how to work in a staff, and training in staff procedure skills.^{1–3} It is believed that good and systematic procedures in staff work will lead to better decisions. However, the relationship between management skills and staff procedure skills has not, to our knowledge, been demonstrated in a scientific way. *Management skills* are defined as the ability to make correct and timely decisions. *Staff procedure skills* mean the ability for a staff to work in a structural and instrumental way.

In order to make it possible to study relationships using quantitative measurements, there must be educational models in which results can be expressed in numbers. There are models using self-assessment as an indicator of the quality of performance, but in order to make results more objective, there is a need for evaluation of performance based on observations by a trained instructor.⁴ An educational model using measurable performance indicators has been developed in which the results from training in disaster management at different levels can be expressed in numbers. The staff procedure skills were evaluated using the same technique.^{5,6} The aim of this study was to demon-

Performance Indicator	Standards (minutes)
1. Decide on level of preparedness	3
2. Formulate initial guidelines for response	15
3. Inform media	15
4. Give information about resources to strategic level	25
5. Ensuring that there is a medical officer in Emergency and Operation	30
6. Estimate need of ICU beds	45
7. First information to staff	60
8. Estimate endurance of staff	90
9. Evaluate and report estimated shortage of own capacity	120
10. Evaluate influence on the daily hospital activities	120
11. Information plan for patients with postponed appointments and operations	180

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Table 1—Performance indicators and standard (minutes) for each indicator for management skills for hospital management groups during disaster medicine training. The possible result of each indicator is 0, 1, or 2. Total possible score is 11 x 2 = 22. (ICU = intensive care unit)

strate the use of measurable performance indicators as a tool for studying the relationships between staff procedure skills and management skills of hospital management groups during disaster medicine training.

Methods

Results from 29 consecutive training sessions (2004–2007) for hospital management groups during simulated major incidents and disasters were included. The training took place either at a national training center (n = 25) or in hospital management rooms designed for real incidents (n = 4). Therefore, the management rooms at the training center are equipped and sized similar to real management rooms, the two different types of premises were considered as equal. The educational system used for training was Emergo Train System.⁷ Using this educational system, incidents and disasters can be simulated using symbols on magnetic whiteboards; the core content consists of a victim bank. The scenarios were: a bus crash with a truck loaded with ammonia; fire and collapse of a football stand; or a train crash. Prior to the training, all participants had been presented lectures both on management skills as well as staff procedure skills.⁸ There were 4–6 participants in each management group. All groups were monitored by an instructor trained in disaster medicine using close circuit television (CCTV). All results were documented using templates developed for management skills and staff procedure skills.⁵

Results were evaluated according to previously developed templates of performance indicators (Tables 1 and 2). These templates also are used in other trainings as well as

1. Assigning functions to all staff-members directly upon arrival
2. Placement in room according to function in staff
3. Designated telephone numbers
4. Introduction of newly arrived staff member Maximum = 1 minute
5. Utilization of available equipment*
6. Maximum 8 minutes for "staff briefing"
7. Content of "staff briefing"?†
8. Telephone discipline during staff briefing
9. Drawing and content of "staff schedule"
10. Summary after session, orally
11. Summary after session, written

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Table 2—Performance indicators for staff procedure skills for hospital management groups during disaster medicine training. The possible result of each indicator is 0, 1, or 2.

Total possible score is 11 x 2 = 22

*Equipment available: Whiteboard, flipchart, fax, computer

†Reports from all functions, summarizing, assigning new tasks, time for next briefing

	Training Center	Real Management Rooms
n	25	4
Management Score	13.8	13.8
Staff Procedure Skills	17.4	14.7

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Table 3—The average score for management groups during training in management rooms at training center or management rooms used during real incidents

during real incidents. The different management groups were given a score of 0, 1, or 2 for each of the 11 performance indicators. Thereby, the highest possible score was 22 points for management skills and 22 points for staff procedure skills. If there were any questions regarding performance or results, these were discussed with the person responsible for the training and research (AR).

The statistical analysis method used was simple linear regression with staff procedure skills as the response variable and management skills as the predictor variable.

Results

There was no difference in the average score for management skills between training conducted at a training center (n = 25) compared with the training at the hospital management rooms designed for real incidents (n = 4) (Table 3). The results of the staff procedure skills were slightly better at the training centre. The highest score given for staff procedure skills was 20.75 points, the lowest was 13.0 points (Table 4). The highest score for management skills was 21 points and the lowest was 6 points (Table 4). When comparing management skills to staff procedure skills, an overall significant relation between both of the variables was identified (p ≤ 0.05; Figure 1).

Discussion

Although teaching of staff procedure skills of how to manage command and control during an incident, is an issue that has been taught for many years in the military setting and in the rescue service, this training is quite new for hos-

Hospital Management	Staff Procedure Skills	Management skills
<i>Number on Group</i>	<i>Score</i>	<i>Score</i>
1a	17.0	16
1b	20.0	21
1c	17.0	15
2a	19.0	16
2b	18.5	21
3a	19.25	13
3b	21.25	17
3c	16.0	10
4a	19.5	18
4b	20.75	14
4c	20.2	15
4d	20.35	13
5a	15.0	14
6a	14.0	13
6b	16.0	17
6c	15.0	15
7a	18.0	18
7b	17.25	8
8a	15.0	11
8b	13.25	8
8c	16.75	6
8d	13.25	6
8e	13.0	12
8f	17.25	13
9a	16.0	16
9b	14.75	14
9c	13.0	11
10a	21.0	14
10b	17.5	16

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Table 4—The score of 29 hospital management groups in staff procedure skills and management skills demonstrated during training in disaster management. The management groups that were trained during the same session are indicated by having the same number.



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Figure 1—There is a linear relationship between staff procedure skills and management skills. ($p \leq 0.05$ using Pearson correlation)

pital staff. However, experiences from staff work, demonstrated in educational settings where the members, in advance, have had the possibility to work together, has demonstrated the need for more education and training.^{5,9} During optimal conditions, persons that are trained together should be the same persons that will work together during an incident, but this is difficult to achieve in the healthcare system. One reason is the necessity of making decisions at an early phase during the incident. This leads to the necessity of basing the initial management groups on immediately available doctors and nurses on call.

To optimize the situation for these early decision-makers, the work must be very structured and well-organized. It previously has been demonstrated that staff procedure skills can be measured in a fairly objective way.^{5,6} Studies also have demonstrated that the management skills on different levels can be measured and results can be analyzed using quantitative methods.^{10,11}

In this study, different management groups, all simulating hospital management during major incidents were studied. Of course this is an artificial setting and whether these results are valid during real incidents is yet to be studied. In order for this to happen, more sophisticated information retrieval systems than paper and pen may be needed; otherwise, there is the possibility that important information may be lost.¹² In this study setting, the management groups are observed by trained observers using closed-circuit television (CCTV), or if the exercise was performed in real management rooms, by a trained person positioned in the room during the exercise. This model has been used for a number of years at this center and several incident managers from the different county councils have been trained in this way. The simulation technique that also allows results to be presented in relationship to patient outcome also has been demonstrated previously.¹³

The two different sets of performance indicators that were used reflect somewhat different types of problem-solving skills. The indicators used for evaluating management skills and most, but not all, of the indicators for staff procedure skills (number 1, 7, 8, 10, and 11) are related to the analytical skills of the groups, or at least one individual of the group. The other skills are more of a mechanical measurement type.^{14,15} However, the indicators have been developed as a consequence of a national development project, and have not been considered as being too difficult or high-level to achieve a good results.

There were no differences with regard to the management groups trained at the center ($n = 25$) compared to the ones trained at their own facilities ($n = 4$) (Table 1); however, because of the small number of groups trained in real incident rooms, caution must be taken with this conclusion.

When the results of staff procedure skills were compared to management, a significant correlation was found between these two variables (Figure 1). This suggests that, at least in this model, there may be a need for hospital managers during disasters and major incidents to be trained in good staff work. This correlation also might reflect that the persons and groups in this study possess analytical skills, and that these skills are important in the management of disaster and major incidents.¹⁴ If more results lead to the same conclusion, this should have an impact on what training should be performed when preparing hospital management groups. Disaster management not only should include training in making correct and timely decisions, but also skills in how to work in a structural way. Given the results from previous studies, this training should be performed repeatedly.⁵ Validation of both the model and the indicators must be done. However, this important first step will provide information on an area of training that may require more attention in the future.

Another issue that must be addressed is whether these results can be compared to results from other types of train-

ing, e.g., computer simulation. When comparable models have been developed, results may give a clue to what is the most effective both from a learning perspective and an economic perspective. Perhaps, even more important is the question of whether the knowledge learned in different training programs will be retained. How frequent is the training needed in order to be confident that the results will be the same in real situations? The skills tested in this study are of procedural type, and it is well known that these skills demand more practice and are more easily forgotten than are psychomotor skills.¹⁵ Repeated studies may be needed; however, this probably would require training and evaluation at a local level and not at a national training center in order to ensure that the groups and/or persons are tested.

The most important issue of whether or not these results have an impact on patient outcome is not addressed in this paper. Previous studies indicate that this can be possible in educational models; however, during actual incidents, more variables with clinical data must be linked to the results of skills in management and staff procedures.

Conclusions

This study suggests that a relationship exists between staff procedure skills and management skills during training in hospital disaster management. More studies are needed to determine if this relationship also can be demonstrated during real incidents and/or disasters.

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