

Rescue workers had greater confidence in their own mastery after the terror attacks of 22 July 2011

Healthcare personnel, the police and the fire and rescue service, as well as voluntary groups, felt that they were supported by management, worked well together and shared a sense of pride in their efforts.

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ABSTRACT

Background: Participation in the rescue effort after the terror attacks of 22 July 2011 was challenging, unprecedented and unpredictable. Work related to major events can be stressful, but can also lead to a sense of personal growth. However, there are few studies that elucidate the experience of gaining confidence in carrying out your own role.

Objective: To investigate the extent to which rescue workers are better equipped to master similar situations in the future. We also wanted to identify what factors are associated with a heightened perception of mastery.

Method: Ten months after the terror attacks on 22 July 2011, healthcare personnel, the police and the fire and rescue service, as well as voluntary groups, participated in a cross-sectional study on professional challenges, perceived support and personal reactions after the events. Qualitative data from healthcare personnel enabled a more in-depth analysis of the findings.

Results: The response rate was 62 per cent (1734/2801). All groups reported that they were now better equipped to master similar situations in the future (average value 3.5–3.7; scale 1–5). Early response (OR 1.5, CI 1.2–1.9), several witnessing experiences (OR 1.5, CI 1.2–1.9) and a greater degree of role clarity (OR 1.5, CI 1.2–1.9) were associated with a heightened perception of mastery. Compared with the under 30s, the perception of mastery was lower in the 30–49 age group (OR 0.7, CI 0.5–0.9 ($p = 0.05$)) and the group aged 50 years and over (OR 0.5, CI 0.3–0.7, $p < 0.001$).

Conclusion: Real events provide a learning opportunity that cannot be gained from studying theory or through simulation exercises. High stress levels were associated with a heightened perception of mastery. Supportive management, the perception of cooperation and pride in their efforts may also have contributed to the healthcare personnel's heightened perception of mastery.

On 22 July 2011, Norway was hit by its biggest terror attack since World War II. Eight people were killed and ten were hospitalised after the bombing of the government buildings in Oslo. About 325 people were in the immediate vicinity of the bomb. At Utøya, 69 people were killed. Of the 564 people attending a summer camp on the island, around half were injured (1).

Under the chaotic conditions, many of the rescue workers felt that they were also in danger, due to fire, unsafe buildings and fear of more bombs. At Utøya, the rescue workers also found that they were under attack.

Earlier surveys of rescue workers have shown a correlation between serious accidents, disasters and the incidence of post-traumatic stress disorder (PTSD) or post-traumatic stress syndrome (PTSS) (2–5). The incidence of PTSD varies from 2 to 21 per cent.

After the terror attacks in Norway, a low incidence (0.3 per cent) of possible PTSD was found among the professional rescue workers (6). The proportion taking sick leave of more than two weeks or requiring psychotherapy was also low (7).

Earlier research

Research has been conducted into personal growth as a result of solving complex new challenges and tasks in connection with a traumatic event (8, 9). This growth is often called post-traumatic growth (8). Studies of psychosocial professionals who help people in crises also show personal growth (10). The same is found among firefighters after major fires (11), and among the police in relation to serious violent crime (12).

In a study on rescue workers in the aftermath of the tsunami in Southeast Asia in 2004, Thoresen (13) found that training, experience and preparedness prior to the rescue work, as well as organisational support, were linked to a heightened perception of mastery. Similar findings have been shown for emergency service personnel, such as police, firefighters and ambulance workers, as well as nurses in intensive care units in hospitals (14).

Studies of growth cover very different events and have varying objectives. The work in connection with the terror attacks in Norway was exceptional in that the rescue workers were faced with a particularly destructive and confused situation.

Objective of the study

Terror attacks are a growing phenomenon in the Western world, and the associated rescue work is challenging and unpredictable. However, such work can also provide learning opportunities that rescue workers cannot gain from simulation exercises.

We have previously found that the degree of preparation – such as training, experience and simulation exercises – was associated with role clarity (15). In this part of the study, we looked at the extent to which earlier experiences impacted on the rescue workers' levels of functioning and mastery during the rescue effort. In this article, we examine whether the rescue workers feel that their efforts led to development and growth.



«Such work can also provide learning opportunities that rescue workers cannot gain from simulation exercises.»

We therefore posed the following research questions:

- To what extent are rescue workers equipped to master similar situations in the future?
- What factors are associated with a heightened perception of mastery?

Method

We conducted a quantitative cross-sectional study about ten months after the event. In addition to questions with response options, we included a section for open text with the heading 'Comments'. We wanted to analyse potential explanations of future mastery that were not captured in the quantitative data. The comments from healthcare personnel were collected by theme. We did not conduct a systematic qualitative analysis, but selected some of the recurring comments that illustrate the quantitative findings.

The inclusion criterion was participation in the rescue and follow-up work of 22 July and the subsequent two weeks. The managers of personnel who took part in the rescue and follow-up work were responsible for identifying the relevant members of staff as well as distributing and collecting the questionnaires.

Completed forms were returned in a locked container or a sealed envelope.

Potential respondents received a reminder after one month. We were unaware of which individuals did not respond, as it was the managers who distributed the questionnaire and the responses were anonymous. We did not perform a strength calculation since we invited everyone who participated in the work.

This survey is part of a bigger study. The method is described in more detail in a previously published article (6).

Questionnaire

The questionnaire was partly based on a survey conducted on rescue workers in the aftermath of the tsunami in Southeast Asia in 2004 (13). In addition, we added some questions about the events of 22 July 2011.

Participants

The participants were divided into groups according to their age: < 30 years, 30–49 years and > 50 years. We wanted to know where the respondents carried out the majority of their rescue effort. The response options therefore consisted of the sites of attack – the government buildings and Utøya – and other workplaces, such as hospitals, support centres for survivors and their families, accident and emergency departments, offices and street patrols. We also wanted to know when they joined the rescue effort, and this was dichotomised to a) 23 July and later, and b) 22 July.

Participants from the public health service consisted of: a) medical professionals (doctors, nurses, other healthcare personnel, ambulance workers, Emergency Medical Communication Centre personnel); b) psychosocial personnel (doctors, nurses, psychologists, other healthcare personnel, clergymen and spiritual advisers, social workers). Operational personnel and office staff from the police took part, and the fire and rescue service was represented by firefighters and rescue personnel as well as divers.

In addition, we included different voluntary groups and the defence sector (the Norwegian Civil Defence, the Norwegian Home Guard, Norwegian People's Aid and Norwegian Rescue Dogs). We asked if they had experience from events with > 5 deaths, with the response options 'No/Yes'.

Casual volunteers at Utøya also participated in the rescue work, but these were not included in this article because the target group was professional rescue workers.

Exposure

Perceived fear of explosion or shooting was measured using the following response options: a) 'No, I didn't feel that', b) 'Yes, was not stressful/hardly stressful at all', c) 'Yes, was moderately stressful', and d) 'Yes, was very stressful'.

Answers b, c, and d were merged since few participants reported moderate or high levels of stress, and it was therefore more appropriate to use a dichotomous variable in the analysis.

Exposure to impressions was measured by the number of witnessing experiences. Participants initially answered seven questions about possible witnessing experiences. A factor analysis yielded two factors: seeing distressed people and seeing or being in the physical presence of seriously injured or dead people. This result is shown in another article (6).

In this article, the variable ‘witnessing experiences’ is used. Here the total stress and result of the seven questions are merged and dichotomised based on the median value 1 to the value ‘0 = not experienced/a few times’ and ‘1 = experienced several’. Questions about verbal abuse or harassment were similarly summarised and dichotomised (‘0 = not experienced’, ‘1 = experienced’. Few reported verbal abuse or harassment as being moderately or highly stressful.

Organisational conditions

Role clarity was measured through the question ‘Did you know your area of responsibility?’, with the response options from ‘1 = not at all’ to ‘5 = to a very high degree’.

We categorised employer support measures under the following alternatives: defusing/debriefing meetings, meetings to mark change, specialists such as a psychologist etc., dinners or other social gatherings, etc. These were merged and dichotomised to ‘No/Yes’. We wanted to examine the total number of support measures implemented.

The outcome variable ‘mastery’ was measured through the following question:

To what extent are you better equipped to master similar situations since 22 July 2011?

We used response options in a five-digit Likert scale, where ‘1 = not at all’ and ‘5 = to a very high degree’.

Statistics

Descriptive data are presented as mean values with a 95 per cent confidence interval (CI) or as absolute numbers and percentages. There were generally few cases of missing data in the question responses (0.4–1.7 per cent). We used chi-square and Kruskal-Wallis tests to compare categorical variables, and ANOVA to compare the mean in normally distributed variables.

In order to counteract the problem of too many comparisons, we used the Bonferroni correction method. In order to identify independent correlations with the outcome metric 'mastery', variables with a bivariate p -value < 0.10 were entered in a multivariate logistic regression. We used unadjusted and adjusted odds ratios (OR) and a 95 per cent CI from logistic regression analysis and associated significance value. The software used was SPSS version 21.0. The significance level was set to $p < 0.05$.

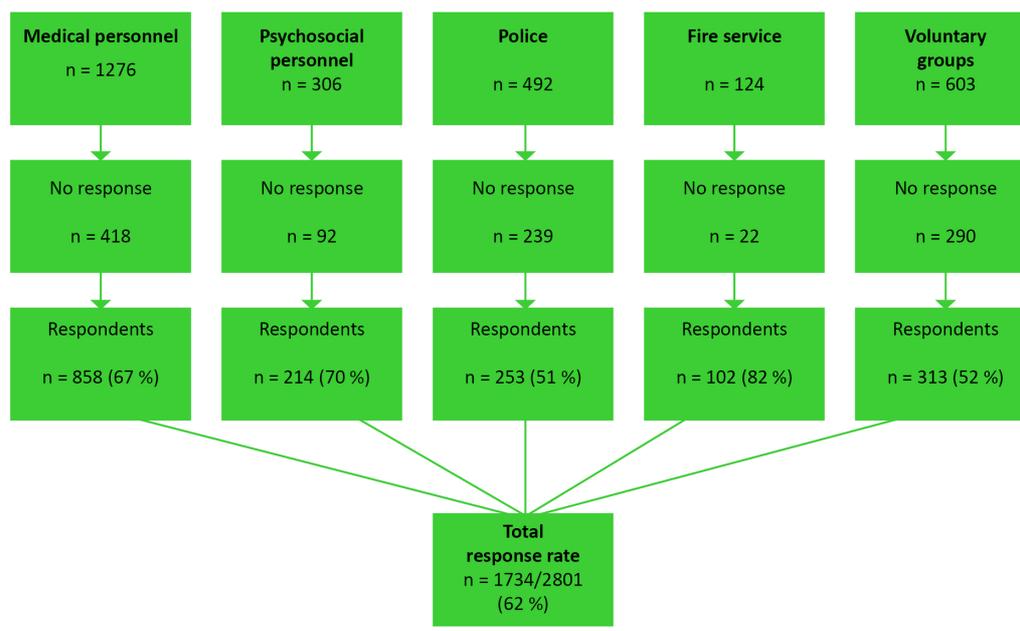
Ethics

All data were collected anonymously. The reminder was therefore sent to everyone who had initially received the questionnaire. The survey was approved by the Data Protection Officer at Oslo University Hospital, who indicated that approval from the Regional Committee for Medical and Health Research Ethics was not required. We stored the data on the research server at Oslo University Hospital.

Results

We sent out a total of 2801 questionnaires, of which 1734 were returned (62 per cent). The response rate ranged from 82 per cent for the fire and rescue service to 51 per cent for volunteer groups (Figure 1).

Figure 1. Rescue workers who were invited to participate in the study (n = 2801)



Sixteen per cent of the medical personnel worked at the sites of the attacks. In comparison, none of the psychosocial personnel worked there, compared to 97 per cent from the fire and rescue service. Most of the medical personnel, the police and the fire and rescue service joined the rescue effort on 22 July. About 25 per cent of the personnel in all groups, except for the volunteer groups (9 per cent), reported having previous experience of accidents involving more than five fatalities (Table 1).

Table 1. Background factors for gender, age, type of work and experience

	Medical personnel n = 858	Psychosocial personnel n = 214	Police n = 253	Fire service n = 102	Voluntary groups n = 313
n (%)					
Gender, Male	283 (33.1)	73 (34.1)	170 (68.0)	100 (99.0)	238 (77.5)
Age					
<30 years	158 (18.5)	18 (8.5)	29 (11.6)	11 (10.8)	67 (21.8)
30–49 years	534 (62.5)	90 (42.3)	172 (68.8)	68 (66.7)	193 (62.9)
>50 years	162 (19.0)	105 (49.3)	49 (19.6)	23 (22.5)	47 (15.3)
Work location 22 July					
Attack sites (govt. buildings, Utøya)	138 (16.3)	0 (0)	92 (36.8)	99 (97.1)	170 (55.4)
Other	710 (83.7)	214 (100)	158 (63.2)	3 (2.9)	137 (44.6)
Joined the rescue effort					
23 July or later	155 (18.1)	103 (48.1)	51 (20.2)	26 (25.7)	156 (50.8)
22 July	699 (81.9)	111 (51.9)	201 (79.8)	75 (74.3)	151 (49.2)
Experience of accidents with > 5 fatalities, Yes	210 (24.7)	58 (27.4)	67 (26.6)	31 (30.4)	27 (8.8)

The proportion of police (50 per cent) and fire and rescue service (62 per cent) reporting a fear of explosion or shooting was higher than for psychosocial personnel (14 per cent), $p < 0.001$ (Table 2). Firefighters also reported having significantly more witnessing experiences than the other groups, with 85 per cent compared to 28 per cent for psychosocial personnel and 43 per cent for police.

Table 2. Exposure to potential external stress factors

	Medical personnel n = 858	Psychosocial personnel n = 214	Police n = 253	Fire service n = 102	Voluntary groups n = 313
Fear of explosion/shooting, Yes, n (%)	287 (34.1)	30 (14.5)	123 (50.0)	63 (62.4)	99 (32.7)
Witnessing experiences					
Few witnessing experiences	404 (47.8)	151 (71.6)	140 (56.5)	15 (14.7)	210 (69.5)
Several witnessing experiences	442 (52.2)	60 (28.4)	108 (43.5)	87 (85.3)	92 (30.5)
Verbal abuse, Yes, n (%)	87 (10.3)	45 (21.4)	64 (26.6)	3 (3.0)	18 (6.0)

Role clarity, measured with a mean value (Table 3), was strongly in evidence for the most part in all groups, but psychosocial personnel (score = 3.6, CI = 3.5–3.7) and police (score = 3.9, CI = 3.8–4.0) reported a somewhat lower mean value compared to the other groups (score = 4.2, $p < 0.001$).

There was no significant difference between medical personnel, psychosocial personnel and police in terms of participation in support services, while the proportion for the fire service was significantly higher (95 per cent). Voluntary groups had a significantly lower proportion (65 per cent) than the three non-significant groups.

Table 3. Work-related variables

	Medical personnel n = 858	Psychosocial personnel n = 214	Police n = 253	Fire service n = 102	Voluntary groups n = 313	P value
Mean value (95% CI) or n (%)						
Role clarity , (scale 1–5) [§] Mean value (95% CI)	4.2 (4.1–4.2)	3.6 (3.5–3.7)	3.9 (3.8–4.0)	4.2 (4.0–4.3)	4.2 (4.1–4.3)	<0.001
Support from employer , Yes, n (%)	656 (81.2)	155 (74.2)	194 (80.5)	92 (94.8)	194 (64.7)	<0.001
Better equipped to master similar situations in the future , (scale 1–5) [§] Mean value (95% CI)	3.6 (3.6–3.7)	3.6 (3.5–3.7)	3.6 (3.5–3.7)	3.5 (3.3–3.6)	3.7 (3.6–3.8)	ns

[§] Scale: 1 = not at all, 5 = to a very high degree.
CI: confidence interval

In the analysis of comments from the healthcare personnel, there were three recurring themes:

- management support
- cooperation
- a sense of pride in own efforts and those of others

Management support

One respondent made the following observation: ‘Our unit manager spent almost an entire day with us. It was great!’ Another commented that ‘We were offered debriefing straight away. Our manager asked us every day (almost a bit too much).’ However, not everyone found the follow-up to be like this, especially those who took holiday leave or were at the end of a temporary position, and who were not offered any follow-up.

Cooperation

Many highlighted the cooperation on the relevant days: ‘The 22nd of July was the worst and at the same time the best shift I’ve ever had. The worst speaks for itself. The best was the way everything worked, where people pulled together, both in my group and across the different professions. No nonsense or dramas.’ One of the pre-hospital service personnel described the situation: ‘Accident and emergency staff at Ullevål put chocolate and fizzy drinks on stretchers for the rescue workers to take with them...’



«The best was the way everything worked, where people pulled together, both in my group and across the different professions.»

Participant

One respondent from the psychosocial personnel wrote the following: ‘The cooperation with somatic healthcare personnel was good, and those of us who came from psychiatry were valued.’ However, there was also one area of frustration among somatic personnel in relation to the lack of psychosocial follow-up of traumatised or critically ill patients and their families in their daily lives. In relation to 22 July, the respondent commented that ‘All support functions were eager to help, unlike normally, when everyone is battling to get resources.’

A sense of pride in own efforts and those of others

One respondent wrote the following: ‘It was nice to see that the system worked and that everyone involved put in so much effort’. Another commented: ‘Ringerike Hospital made an enormous contribution on the 22nd of July... All patients survived.’

A third highlighted the following: ‘I am proud that we managed to deal with this kind of situation in such a professional manner... [It was] a privilege as a healthcare worker to be allowed to contribute ... [I] will remember the work with gratitude.’ The respondents’ comments also reflected some of the challenges.

One respondent described how there was ‘A sense of powerlessness among those who didn’t get the chance to contribute, who had the expertise, but who ‘weren’t needed’.

One respondent concluded by saying, 'Of course I would like to think that I would cope well in a similar situation after 22/7, but you just never know. I think I'm better prepared for my own reactions since the attacks'.

All groups reported that they were now better equipped to deal with similar situations, and there were no significant differences between the groups (score = 3.5–3.7).

Factors linked to perception of mastering similar situations in the future

Fourteen variables were subjected to an unadjusted analysis of the perception of mastering a similar situation in the future. In the multivariate adjusted analysis, some variables were significantly associated with mastering similar situations in the future.

Compared with the under 30s, the perception of mastery was lower for the 30–49 age group (OR 0.7, CI 0.5–0.9, $p = 0.05$) and the age group 50 years or older (OR 0.5, CI 0.3–0.7, $p < 0.001$).

We found a heightened perception of mastery among those whose response effort began on 22 July, compared to those who started later (OR 1.5, CI 1.2–1.9, $p = 0.002$). This was also the case for personnel who had one or more witnessing experiences (OR 1.5, CI 1.2–1.9, $p = 0.002$) and those who experienced a greater degree of role clarity (OR 1.5, CI 1.2–1.9, $p = 0.002$).

Compared with medical personnel, the perception of mastery was higher among psychosocial personnel (OR 1.9, CI 1.3–2.7, $p < 0.001$), police (OR 1.4, CI 1.0–2.0, $p = 0.024$) and volunteer rescue workers (OR 1.7, CI 1.2–2.3, $p = 0.001$), but lower for firefighters (OR 0.6, CI 0.4–1.0, $p = 0.052$). There was no significant gender disparity.

Discussion

All groups reported that they were better equipped to master similar situations after the terror attacks. The explanatory variables ‘joined the rescue effort on 22 July’, ‘several witnessing experiences’, ‘greater degree of perceived role clarity’ and ‘young age’ were associated with greater confidence in future mastery.

STAMI Report no. 3 (14) emphasises that mastering challenges can improve resilience. This assumption was linked to findings from a study of firefighters, whose confidence in their own mastery had a protective effect against depression and PTSD. In the same report, Skogstad et al. argue that rescue workers, such as police and firefighters, tend to be selected for the role and trained in tasks that are performed under demanding conditions.



«All groups reported that they were better equipped to master similar situations after the terror attacks.»

The respondents in our study were selected in terms of education and training for tasks performed under demanding conditions, which may support our findings. We found that young age was associated with confidence in mastering situations. Janacsek et al. (16) found a gradual reduction in reaction time and capacity for observation with increasing age (4–85 years).

No such reduction was observed in young adults or the middle-aged. However, there is reason to believe that because younger rescue workers have less experience, participating in disaster efforts could have a greater learning effect. It is conceivable that they developed new mastery strategies in connection with the work, something that was also highlighted in a study of the police in the STAMI report (14).

Since the level of post-traumatic symptoms in our study was generally low (6), there is reason to assume that the perception of mastery was high and that this has impacted on the learning experience.

Correlation between start day and confidence in future mastery

A correlation was found between greater confidence in future mastery and the variable 'joined the rescue effort on 22 July'. The work on this day also presented more challenges. Threats and witnessing experiences are likely to exceed the threshold for mastery and lead to more post-traumatic symptoms and less learning, particularly where prolonged exposure has hampered the work.

The rescue effort on 22 July was carried out in a relatively short timeframe, and most reported a large degree of role clarity and support from their employer. In addition, respondents from the health service described good cooperation and a sense of pride in their efforts. The foregoing may indicate that there is a 'window' in which the degree of challenges can lead to the best learning experience: if the threshold for mastery is exceeded, the situation may be perceived as traumatic, and if the challenges are not sufficiently taxing, there will be little to learn.

The low scores on post-traumatic stress reactions indicate that this event has not exceeded the mastery threshold. Although most of the fire and rescue service personnel reported witnessing experiences, they did not differ significantly from the other groups. This may be linked to the fact that most of them had experience from similar work.

We do not have data to explain why the police seemed to be slightly more affected. However, the challenges were undoubtedly less familiar to them, and they also received more criticism afterwards (1).

Role clarity linked to mastery

Greater role clarity was associated with a heightened perception of mastery in our study. A study of police showed that work-related organisational conditions, including lack of role clarity and poor social interaction with colleagues, were linked to PTSD (14). Particularly in cases where something goes wrong, there can be a sense of inadequacy and inability to master a situation.

The access to resources in the aftermath of the terror attacks in Norway was never challenged, and those involved could work on familiar job tasks. Many described a team spirit and an eagerness for inter-professional cooperation.

The challenges faced by psychosocial personnel, police and voluntary groups, were likely to be tougher than those in their daily work. Being able to master these challenges may have given them greater confidence in future mastery. Many of the hospital workers reported that their tasks in the rescue effort were largely what they are used to, but that the influx of patients was higher.

In the unadjusted regression analysis, gender (female) was associated with greater confidence in future mastery, but this correlation disappeared in the adjusted analysis. Circumstances related to the actual event and role clarity thus appear to be more closely linked to confidence in future mastery than to gender.

We cannot provide a definitive explanation for the gender disparities, partly because of the skewed gender distribution among personnel, and because it was the occupations with a high proportion of men that were exposed to the greatest risks.

Perceived level of support from employers had no significant correlation to confidence in future mastery. There are several possible explanations for this. We combined various measures, such as debriefing, meetings to mark change and social gatherings. The form and content of these meetings will vary, and they are not all aimed at processing experiences and perceptions.

Social support, not least from employers, is crucial after extremely stressful situations. The criticism of the police has no doubt been an additional burden for many officers. Research has shown that support after serious events can reduce the incidence of post-traumatic stress (14). The outcome metric in the article was confidence in future mastery, not PTSD.

Strengths of the study

We examined perceptions after an actual event and compared different professional groups who were involved. The response rate was moderate to high, which represents a strength in comparison to similar surveys.

The results from the fire and rescue service can be generalised because the response rate was high for this group. They probably represent a more homogeneous group in terms of work tasks, as they were hands-on at the sites of the attacks. The rescue workers in the other groups probably had a larger variety of tasks (operational, treatment, office, etc.).

We need to take a more cautious approach to generalising the results for the groups with a lower response rate. The participants in these groups also represented a variety of professions and therefore had a wider range of tasks. Using the respondents' comments to underpin their impressions of mastery is one of the strengths of the study.

Weaknesses of the study

Results are based on the subjective experience of the event in question – as assessed by those involved about ten months after it took place. A cross-sectional study only gives a snapshot of the situation. Terror attacks, and other major events, occur without warning. It is also conceivable that groups who were particularly exposed were less likely to answer the questionnaire.

The survey is based on self-reporting, and interviews could have provided more information. It is a weakness of the study that we do not have a better metric for a heightened perception of mastery after the event. This is because we were not prepared for finding such a positive correlation when we designed the study. However, we believe that our metric is sufficient to cover our main point, which is that the challenging work of the rescue workers has led to personal growth.

We also believe that we can demonstrate some factors that are associated with a heightened perception of mastery. It would have been preferable to decide which variables to include in the adjusted analysis before we performed it. However, since we did not foresee see the potential that emerged from the study, we had to choose the analyses later. Nevertheless, we believe that the variables used are relevant.

Clinical implications

Even though simulation exercises are important, real events provide a learning opportunity that cannot be gained through studying theory or from the exercises. A natural part of management's work will be to ensure the follow-up and support of rescue workers after serious events. This can enhance the perception of mastery and cooperation.



«Even though simulation exercises are important, real events provide a learning opportunity that cannot be gained through studying theory or from the exercises.»

Conclusion

All groups of rescue workers reported that they had greater confidence in their own mastery in similar situations after the terror attacks of 22 July 2011. Several factors, such as joining the rescue effort on the same day it happened, exposure to several potentially stressful witnessing experiences, perceptions of role clarity and young age, were associated with greater confidence in future mastery.

Future research is needed to investigate the impact of supportive management, cooperation perceptions and pride in own efforts and those of others.

References

1. NOU 2012: 14. Rapport fra 22. juli-kommisjonen. Oslo: Departementenes servicesenter, Informasjonsforvaltning; 2012.
2. Hartley TA, Violanti JM, Sarkisian K, Andrew ME, Burchfiel CM. PTSD symptoms among police officers: Associations with frequency, recency, and types of traumatic events. *International Journal of Emergency Mental Health and Human Resilience*. 2013;15(4):241–54.
3. Skogstad M, Skorstad M, Lie A, Conradi HS, Heir T, Weisæth L. Work-related post-traumatic stress disorder. *Occupational Medicine*. 2013;63(3):175–82. DOI: [10.1093/occmed/kqt003](https://doi.org/10.1093/occmed/kqt003).

4. Perrin MA, DiGrande L, Wheeler K, Thorpe L, Farfel M, Brackbill R. Differences in PTSD prevalence and associated risk factors among World Trade Center disaster rescue and recovery workers. *American Journal of Psychiatry*. 2007;164(9):1385–94.
5. Whalley MG, Brewin CR. Mental health following terrorist attacks. *British Journal of Psychiatry*. 2007;190:94–6. DOI: [10.1192/bjp.bp.106.026427](https://doi.org/10.1192/bjp.bp.106.026427).
6. Skogstad L, Heir T, Hauff E, Ekeberg Ø. Post-traumatic stress among rescue workers after terror attacks in Norway. *Occupational Medicine*. 2016;66(7):528–35. DOI: [10.1093/occmed/kqw063](https://doi.org/10.1093/occmed/kqw063).
7. Gjerland A, Pedersen MJB, Ekeberg Ø, Skogstad L. Sick-leave and help seeking among rescue workers after the terror attacks in Norway, 2011. *International Journal of Emergency Medicine*. August. 2015;8:31.
8. Blix I, Hansen MB, Birkeland MS, Nissen A, Heir T. Posttraumatic growth, posttraumatic stress and psychological adjustment in the aftermath of the 2011 Oslo bombing attack. *Health and Quality of Life Outcomes*, 2013;11:160. DOI: [10.1186/1477-7525-11-160](https://doi.org/10.1186/1477-7525-11-160).
9. Dyregrov A, Dyregrov K. Positiv vekst etter livskriser – implikasjoner for praksis. *Tidsskrift for Norsk Psykologforening*. 2011;48(9):873–7.
10. Brockhouse R, Msetfi RM, Cohen K, Joseph S. Vicarious exposure to trauma and growth in therapists: The moderation effects of sense of coherence, organizational support, and empathy. *Journal of Traumatic Stress*. 2011;24(6):735–42. DOI: [10.1002/jts.20704](https://doi.org/10.1002/jts.20704).

11. Leykin D, Lahad M, Bonne N. Posttraumatic symptoms and posttraumatic growth of Israeli firefighters at one month following the Carmel fire disaster. *Psychiatry Journal*. 2013; article ID 274121. DOI: [10.1155/2013/274121](https://doi.org/10.1155/2013/274121).
12. Chopko BA. Posttraumatic distress and growth: an empirical study of police officers *American Journal of Psychotherapy*. 2010;64(1):55–72.
13. Thoresen S. Mestring og stress hos innsatspersonell og journalister mobilisert til Tsunamikatastrofen. Oslo: Nasjonalt kunnskapssenter om vold og traumatisk stress; 2007. Rapport nr. 2/2007.
14. Skogstad M, Skorstad M, Lie A, Conradi HS, Lau B, Heir T, et al. Posttraumatisk stresslidelse (PTSD) og arbeidslivet. Oslo. Nasjonalt kunnskapssenter om vold og traumatisk stress og Statens arbeidsmiljøinstitutt; 2011. STAMI- rapport; årgang 12, nr. 3.
15. Pedersen MJB, Gjerland A, Rund BR, Ekeberg Ø, Skogstad L. Emergency preparedness and role clarity among rescue workers during the terror attacks in Norway July 22, 2011. *PLoS One*. 2016;11(6). DOI: [10.1371/journal.pone.0156536](https://doi.org/10.1371/journal.pone.0156536).
16. Janacsek K, Fiser J, Nemeth D. The best time to acquire new skills: age-related differences in implicit sequence learning across the human lifespan. *Developmental science*. 2012;15(4):496–505. DOI: [10.1111/j.1467-7687.2012.01150.x](https://doi.org/10.1111/j.1467-7687.2012.01150.x).