Influences of Subjective Perception on Critical Incidents upon Mental and Physical Health

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Abstract

This study aims to identify those experiences that employees of the Inspectorate for Emergency Situations (IES) – rescuers - define as critical incidents. In addition we intend to understand which of these critical incidents are considered most relevant and also if there are significant differences among distinct departments within the IES. The study shows that those incidents that refer to the individual’s own life and safety as well as those interventions that regard one’s relatives and acquaintances is most relevant. Also, we identified a strong correlation between age and relevant critical incidents as well as significant differences in the way employees rank the critical incidents in strict relation with the type of interventions they take part in.

Keywords: Critical incident, stress response, Inspectorate for Emergency Situations, type of intervention;

1. Introduction

This study is part of a larger ongoing investigation which aims to identify the ways in which intense and prolonged exposure to critical incidents influence mental and physical health in the case of professional rescuers, employees of the Inspectorate for Emergency Situation Arad, Romania. The nature of the interventions that the employees of the Inspectorate for Emergency Situations (IES) are asked to take part imply a high degree of exposure to emotionally charged events such as fires, paramedic interventions, extrication, underwater search interventions, chemical, biological and nuclear accidents and pyrotechnic interventions. Exposure to such events determine a strong psychological response, at cognitive, emotional and behavioral level, thus conditioning the efficiency and safety of further interventions as well as the employees well being. The professional rescuers are exposed to risks varied across the spectrum from minor to major, like: human tragedies, deaths, serious injuries, etc. Being a professional rescuer, by definition, is fraught with tension and risk. Major events such as

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terrorist attacks at World Trade Center, bombing subway and train stations in Europe, the earthquakes in Haiti are examples of treats to physical and mental health of rescuers. Exposure to traumatic events is common in their job. (Bryce, C.P. 2001)

In a 1999 study ran in Australia, 56% of professional rescuers indicated that their safety was highly threatened during interventions (Marmar, Weiss, Metzler, Ronfeldt & Foreman, 1996). In a similar Canadian study, 40% state that they have witnessed fatalities (Regehr, Hemsworth, Leslie, Howe & Chau, 2004). In a 2011 survey carried out in Romania, among the professional rescuers, 34% of respondents stated that they have lived at least one moment of crisis in their activity.

2. The critical incident

2.1. Theoretical approach

A critical incident can be thought of as any stressful event that has the potential to cause a crisis to one or more individuals. More accurate, the critical incident is the stimulus that causes the response to the crisis. Critical incidents can be defined as events or situations “that have sufficient emotional to exceed the normal coping abilities” on an individual, in our case that of the professional rescuer. Thus, critical incidents must be defined in relation with the activity’s main features. (Caine, R.M. & Ter-Bagdasarian, L.2003)

A critical incident is any traumatic event that receives the attribute of “critical” because of its potential to cause disruption or malfunction or stress. Lazarus, R.S., Folkman, S. (1984). A response to the current crisis is defined as the present state of an individual whose coping resources were overcome by the incident and there is evidence of failure or difficulty. Other researchers define the critical incident as a stressful event, so strong, that exceeds the individual’s existing coping skills, involves a high degree of danger, thus generating feelings of vulnerability and lack of control over the situation. Kleban, I. (2008).

A pilot study conducted by Burns and Rosenberg (2001), describes how some traumatic events become critical incidents and offers a new conceptualization of the term critical incident. Interaction between critical events, each rescuer’s reaction to the event and each lifesaver performance generate a fourth element of a critical incident, namely the interpretation that the rescuer attributes to that specific event, at cognitive, affective and behavioral level.

The characteristics of a critical incident are a disturbed sense of control, low occurrence probability, sudden character, modified beliefs, values and concepts about the world, people and activity. Not to mention that it can be a vital threat and can generate physical and emotional loss. Due to their psycho-emotional overload, critical events may trigger responses which could lead to psychological and physical malfunctions such as depression, anxiety, post-traumatic stress disorder, hormonal dysfunctions, cardio-vascular symptoms and many others. (Flannery, R.B & Everly, G.S. 2000).

2.2. Classification. Types of critical incidents

The most common critical incidents cited are: death or suicide of a relative, friend or colleague, natural disasters, terrorist attacks, robberies, atrocities, epidemics, famine, life or physical integrity threats, direct or indirect significant traumatic events involving children. Some authors sustain that the death of a child is a major critical incident (Regehr, Hill & Glancy, 2000). In a distinct classification, the authors list the following types of critical incidents: death of a victim after a long rescue attempt, mass casualties, situations during which the life of the professional rescuer is in danger, changes in employment or professional activities, personnel cuts and layoffs, promotion, restructuring of department or organization. Other classification contain events such as: direct contact with deceased, care of severely injured people, care of individuals with mental disorders, direct contact with the
victim/s family (more so if one has the task to inform the family about the deaths of their relatives and/or to explain the details of the tragic event) (Mamar et al., 1996; Regehr et al., 2004).

Mitchell (1983), in their initial conceptualization on critical incidents, in the field of professional rescuers, identified the following types: serious injury or death of a member of the emergency squad, death of a civilian during rescue operations, death of a child, sudden death of the rescued person. As there is no universally accepted definition of a critical incident, each rescuer is put in a position to define, at the subjective level, what is a critical incident in his case. Thus, rescuers construct the incidents on how they experience and perceived it and on the context in which the events occur.

Summarizing, we can say that critical incidents are varied. An event that for one rescuer consists in a major critical incident can be considered as minor or mild for another rescuer. So, even if we define one event as a critical incident, we cannot accurately appreciate the degree of distress it causes in every rescuer’s case.

Factors which influence the professional rescuer’s response to a critical incident include: dosage of exposure to critical incidents, length of exposure, time interval between different critical incidents, organizational climate and environment, social support, individual factors (such as: personality traits, cumulative life stressors, previous mental health issues, individual life history, coping abilities, age, professional experience). Carlisle, C.F. (1999). Although there is no precise number of factors influencing the individual’s psychological response to critical incidents, a complete model of stress response to critical incidents must take into consideration the interaction between characteristics of the critical incident and those of the individual (Regehr et al., 2004).

3. Participants and method

3.1. Participants

The study was conducted on a group of 180 male individuals, all professional rescuers, aged between 25 and 49 (mean age = 34.28, standard deviation = 4.67). Their length of service in the field ranges from 6 to 20 years (mean = 8.87, standard deviation = 3.00). Subjects are grouped into six categories according to the type of interventions they take part in, each group being consisted of 30 individuals. The six types of interventions are: a) firefighting, b) paramedics (SMURD), c) extrication, d) nuclear, bacteriological, chemical and radiological accidents (NBCR), e) divers, underwater search missions and f) pyrotechnic. Actually these six categories of intervention also reflect the departmental structure of the IES in Romania.

Mean age for the six groups, ranges from 30.57 years (firefighters) to 40.03 years (pyrotechnics). In terms of experience in the field, the means range between 6.93 years (firefighters) and 11.53 (pyrotechnics). On average, the firefighters are the youngest group and also have fewer years spent in the field while pyrotechnics are the oldest group and also have the most years spent in the field.

The six groups differ significantly in terms of age (F = 47.00, p < 0.001) and in terms of years spent in the field (F = 20.527, p < 0.001). In terms of age, the pyrotechnic and extrication groups show higher values being on average older than the firefighters and those in the extrication, SMURD and NBCR groups. As for the time spent in this specific field of activity, extrication, divers and underwater rescuers as well as pyrotechnics groups show higher values than firefighters, SMURD and NBCR.

3.2. Method

Based on the definitions found in the literature on critical incidents, the subjects were asked to nominate several critical incidents they took part in. A set of nine critical incidents considered being most relevant for the
investigation was drawn depending of the participant’s answers. The nine critical incidents extracted were presented in a random order and the participants were then asked to rank each item on a scale ranging from 1 (the most significant) to 9 (the less significant). Equal ranks were not allowed.

The nine critical incidents were coded as follows (the code number reflects the position in the list presented to the participants): i1 – rescuing victims in the agony of death; i2 – handling and/or transporting deceased victims and/or human fragments; i3 – rescue operation with multiple victims; i4 – sudden death of victims during the rescue operations; i5 – severe injury sustained by the rescuer during the intervention; i6 – voluntary exposure to life threatening interventions; i7 – taking part in interventions involving relatives or friends of the professional rescuer; i8 – death of a rescuers’ crew member during the intervention; i9 – impossibility to rescue the victims.

3.3. Study hypotheses

I1: We infer that there is a significant association between age and subjective perception on critical incidents.
I2: We infer that there is a significant association between length in the field of activity and subjective perception on critical incidents.
I3: We infer that the type of interventions to which professional rescuers are exposed to influences significantly their subjective perception on critical incidents.

4. Results

For the group as a whole, the classification of critical incidents, at a subjective level, shows that the lowest rank, thus most relevant, is obtained by i5 - severe injury sustained by the rescuer during the intervention (mean rank = 3.83), followed by i7 - taking part in interventions involving relatives or friends of the professional rescuer (mean rank = 3.87) and i6 - voluntary exposure to life threatening interventions (mean rank = 4.23). In the midst we find i3 - rescue operation with multiple victims (mean rank = 5.05), i2 – handling and/or transporting deceased victims and/or human fragments (mean rank = 5.24) and i8 - death of a rescuers’ crew member during the intervention (mean rank = 5.38). In the lower positions (highest mean ranks) lie: i4 - sudden death of victims during the rescue operations (mean rank = 5.45), i1 – rescuing victims in the agony of death (mean rank = 5.62) and i9 - impossibility to rescue the victims (mean rank = 6.33).

We found that the critical incidents in which the likelihood of physical and/or psychological sufferance of the rescuer or a person close to the rescuer is greater are perceived as most traumatic. Second come those events which either imply numerous, collective victims or involve a member of the rescue crew or exposure to death through the experience of the victim. At the bottom of our ranking one can find those events perceived as less controllable or which enable rescuers to face the limitations of their actions. The intrinsic nature of these critical incidents is that a death experience is highly probable, at least once. Incidents that involve direct experience of death or high probability of a death experience facing the rescuer’s person directly have a higher position in the ranking given by the participants in this study. While incidents where death experience is not direct but mediated by fellow rescue crewmembers or probability of a death experience is low are placed at the bottom of the ranking. Thus, it appears that psychological response to death experience is a powerful unifying feature among professional rescuers, reducing inter-individual differences in response triggering probability, but those differences tend to expand when we investigate the diversity of response types to critical incidents.

Investigating the ranking for each of the sic groups we observe that there are not even two groups to have same incident ranked first while i3 (firefighters and divers) and i9 (SMURD and extrication) do appear twice as ranked last. Below we show the highest rank three incidents for each group (the figures in the brackets indicate the mean rank):
• Firefighters: i5 - severe injury sustained by the rescuer during the intervention (1.30); i7 - taking part in interventions involving relatives or friends of the professional rescuer (2.30); i4 - sudden death of victims during the rescue operations (5.00).

• SMURD: i1 - rescuing victims in the agony of death (1.20); i3 - rescue operation with multiple victims (2.63); i4 - sudden death of victims during the rescue operations (2.63).

• Extrication: i3 - rescue operation with multiple victims (1.27); i2 - handling and/or transporting deceased victims and/or human fragments (1.73); i1 - rescuing victims in the agony of death (4.63).

• NBCR: i9 – impossibility to rescue the victims (2.43); i7 - taking part in interventions involving relatives or friends of the professional rescuer (3.23); i5 – severe injury sustained by the rescuer during the intervention (3.87).

• Divers / underwater rescuers: i6 – voluntary exposure to life threatening interventions (1.73); i2 - handling and/or transporting deceased victims and/or human fragments (2.33); i5 – severe injury sustained by the rescuer during the intervention (3.80).

• Pyrotechnics: i7 - taking part in interventions involving relatives or friends of the professional rescuer (1.30); i6 – voluntary exposure to life threatening interventions (2.23); i8 – death of a rescuers' crew member during the intervention (4.40).

In order to investigate the association between subjective reception on critical incidents and age, on one hand, and time spent in the field of professional rescue activities, on the other hand, we used the ρ Spearman correlation due to the fact that one the variables (subjective perception on critical incidents) is a ordinal variable (Rateau, 2004). Table 1 presents the results of the correlations (all correlations are two-tailed).

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We found significant positive correlations between age and subjective perception on critical incidents for i1 and i5, meaning that those individuals who gave higher ranks for i1 and i5 (meaning less importance) are older than those who ranked the two incidents lower (meaning high importance). In the cases of i6 and i8, due to the negative correlations obtain, it seems that elder professional rescuers tend to rank as more important these two incidents while younger ones tend to rank them as less important. For the significant correlations, the percentages of common variance shared by the two variables range between 3% and 16%. Thus, in certain cases, age seems to have o role in the way people perceive events as critical incidents.

For the relation between subjective perception on critical incidents and time spent in rescue activities we found that for i1, i4 and i5, elder professional rescuers tend to appreciate these events as less critical while younger professional rescuers consider them more critical. For i2, i6 and i8, the tendency is reversed; so younger professional
rescuers tend to consider these three incidents as less critical while elder ones as more critical. Percentages of common variance, shared by the two variables, range between 2% and 8%, showing that even if time spent in professional rescue activities does tend to associate with subjective perception on critical incidents, the power of the association is not very high.

As it is well known, professional experience in one field of activities is generally related with age among other factors. In our case the correlation between age and professional experience in the field of rescue activities is 0.675 (Pearson two – tailed correlation) meaning that the two variables share a large amount of their variance, that is more than 45%. Partial correlation between age and subjective perception on critical incidents when experience in professional activities is controlled revealed significant correlations for i1 (\( \rho = 0.19, p = 0.011 \)), i3 (\( \rho = -0.15, p = 0.046 \)), i5 (\( \rho = 0.33, p < 0.01 \)) and i8 (\( \rho = -0.18, p = 0.012 \)). When age is controlled, correlations between experience in professional rescue activities and subjective perception on critical incidents revealed no significant correlations, thus meaning that only age seems to directly influence subjective perception on critical incidents while experience in professional rescue activities has no direct influence upon subjective perception on critical incidents but moderates the association between age and subjective perception on critical incidents.

Due to the fact that subjective perception on critical incidents is an ordinal variable, for the comparisons between the six groups of subjects, we used nonparametric Kruskal – Wallis test. Chi-Square values range between 41.337 (for i8) and 138.741 (for i2). All coefficients are significant at a threshold lower than 0.001, meaning that there are significant differences among the six groups in the way they ranked each of the nine critical incidents investigated. But Kruskal – Wallis coefficients only give the general picture; therefore we compared pairs of groups with U Mann – Whitney test in order to identify significant differences from one group to all others.

Results show significant differences in the way that firefighters and paramedics (SMURD) perceive investigated events as more or less critical relate to incidents i1, i2, i3, i4, i5, i7 and i9. To i1, i3 and i4, firefighters tend to attribute higher ranks compared to paramedics, while to i2, i5, i7 and i9 firefighters tend to attribute lower ranks compared to paramedics. Comparison between firefighters and extrication shows a tendency for firefighters to attribute significant lower ranks to i5, i6, i7 and i9 and significant higher ranks to i1, i2 and i3. When compared to NBCR rescuers, firefighters tend to attribute significant lower ranks to i1, i2, i4, i5 and i7 and significant higher ranks to i3, i6 and i9. Compared to divers/underwater rescuers, firefighters attribute significantly lower ranks to i4, i5, i7 and i9 and significantly higher ranks to i2 and i6. While compared to pyrotechnics, firefighters attribute significantly lower ranks to i1, i2 and i5 and significantly higher ranks to i6, i7 and i9.

Comparison between paramedics and extrication shows a tendency for the first group to attribute significantly lower ranks to i1, i4 and i6 and significantly higher ranks for i2, i3 and i8. Related to NBCR rescuers, paramedics attribute significantly lower ranks to i1, i3 and i4 and significantly higher ranks to i2, i6, i7, i8 and i9. Regarding the comparison to divers/underwater rescuers, paramedics show significantly lower ranks for i1, i3 and i4 and significantly higher ranks for i2, i6, i7 and i8. While compared to pyrotechnics, paramedics tend to attribute significantly lower ranks to i1, i2, i3 and i4 and significantly higher ranks for i6, i7, i8 and i9. Comparing extrication with NBCR rescuers, result show a tendency for the first group to attribute significantly lower ranks to i1, i2, i3 and i4 and significantly higher ranks to i5, i6, i7 and i9. In comparison to divers/underwater rescuers, extrication rescuers show significantly lower ranks to i1, i2, i3 and i4 and significantly higher ranks for i5, i6, i7 and i8. While compared to pyrotechnics, extrication rescuers tend to attribute significantly lower ranks to i1, i2 and i3 and significantly higher ranks to i6, i7, i8 and i9. The NBCR rescuers show significantly lower ranks than divers/underwater rescuers for i3, i7 and i9 and significantly higher ranks for i2 and i6. When compared to pyrotechnics, NBCR rescuers tend to attribute significantly lower ranks to i2, i5 and i9 and significantly higher ranks to i4, i6 and i7. Finally, comparing divers/underwater rescuers to pyrotechnics, significantly differences were identified for i2 and i6 (divers/underwater rescuers show lower ranks), on one hand, and for i3, i4, i7 and i9 (pyrotechnics show lower ranks). Summarizing, we can say that the type of interventions does influence in large
amount the subjective perception of professional rescuers on critical events; thus, exposure to different type of events does influence the degree in which individuals assess events as more or less critical.

5. Discussion

The Spearman correlation indices show that there are significant associations between subjective perception on critical events and age and between subjective perception on critical events and professional experience as rescuer. Thus, hypothesis 1 and 2 are confirmed. Critical incidents involving higher risk of serious injury and agonizing death of the victims tend to be rated as more relevant by the younger professional rescuers while those involving risks of loosing their lives or the life of a colleague are rated as more relevant by the elder professional rescuers. Due to the fact that controlling the variable professional experience there are no significant changes in the correlations between age and subjective perception on critical incidents and, usually, professional experience is related to age, we conclude that professional experience does not influence subjective perception on critical incidents, directly, but it moderates the influence of age upon it. Therefore, periodically mental and physical health investigation seem necessary in order to prevent and reduce the risks of developing certain mental and physical states inadequate for professional rescue activity.

Also, we identified significant differences among the professional rescuers on the basis of the type of interventions they take part in, thus, validating the third hypothesis. Results show that different exposure, in length and intensity, to different type of events significantly influences the way that individuals perceive events and rate them as more or less critical. Due to fact that rescue activities do tend to have a high emotional charge, it seems that individual differences are not sufficient to explain distinct rating of events, a very important factor being the characteristics of the event. Thus, subjective perception on critical events is not that subjective after all. External, objective characteristics of events do tend to play a large role in the way people perceive and interpret events they experience. We would like to point out that similar studies should also investigate the relation between intensity and frequency of exposure to critical incidents and perception of events, not just the type of critical incidents.

In conclusion, we can state that subjective perception on critical incidents by professional rescuers is influenced by the type of interventions they participate in, the type of intervention determines the events the are exposed to, but, to some extend, it also determines the frequency of exposure due to the fact that some type of events, such as car accidents, fires, underwater searches are more frequent than bomb threats or nuclear, bacteriological, chemical or radiological accidents. Also, we identified that elder professional rescuers who also spent more years in this field of activity tend to be more sensitive to events implying a real risk of losing their lives, while younger and less experienced professional rescuers are more sensitive to events implying direct contact with deceased, badly injured or agonizing victims. Yet, each critical event has a high psycho-emotional charge, which increases the probability of developing mental, or physical health problems in time.

We strongly believe that age and type of incidents are not the only two factors that influence professional rescuers’ subjective perception on critical incidents. Other factors such as personality traits, self esteem, perceived auto-efficacy, robustness, optimism, sense of coherence, stress coping abilities, time interval between two consecutive exposures to critical incidents must also be investigated in order to draw a complex and accurate picture of what influences professional rescuers’ perception of events as more or less critical but also to be able to identify as many risk factors which could lead to mental and physical impairment.
References


