A human component to consider in your emergency management plans: the critical incident stress factor

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Abstract

In recent years the issue of human stress response in emergency workers has begun to receive attention. This paper presents a rationale for considering human stress as a significant factor in the management of emergencies. It discusses the concept of stress, Critical Incident Stress in emergency responders, and introduces the Critical Incident Stress Debriefing (CISD) process. It is suggested that, in a disaster, the CISD process can improve the effectiveness of response teams on site, their turnaround time on site, and post disaster time off the job. This paper, prepared by a US Bureau of Mines research psychologist, offers some ideas to the mining industry in general, mine rescue trainers, and more universally, to those responsible for developing emergency management plans.

1. Introduction

A main focus in the management of emergencies has been on resources and logistics; in other words, having *what* and *who* you need, *where* and *when* you need it to meet the crisis within an urgent time frame. The necessary resources include an emergency management plan, trained manpower, appropriate equipment, available communication, plus knowledgeable and decisive leaders. In the mining industry, emergency response planners have concentrated on designing better and safer equipment, producing escape apparatus such as the person-wearable, self-contained self-rescuers (Figs. 1 and 2), decreasing response time, increasing training of mine rescue teams, and on developing escape plans that comply with mine safety regulations. Mining operators must develop escape plans that are designed to comply with the United States Code of Federal Regulations for underground and for surface mining.

Immediate and appropriate response to mine disasters is, of course, essential to minimize the severity of accidents, loss of life and the possibility of the loss of the future productivity of the mine. Designing improved equipment along with the application of other new technologies and focused training increases the efficiency of the rescue worker. However, an

Fig. 1. Miners donning self-contained self-rescuers in an underground mine.

often overlooked consideration in mine and other disaster training and management programs is the impact of stress on the emergency workers themselves. In addition, increased technology has brought more efficient communication, such that personnel in the command center have the potential for experiencing some of the same stress effects as the front line emergency workers. This paper offers information and suggestions on how the effects of human stress on emergency/rescue workers may be factored into emergency management planning.

2. The stress response

The stress response is a normal human characteristic. Although there is less than total agreement on the nature of human stress, the following discussion will acquaint the reader with some basic concepts. Hans Selye, an Austrian endocrinologist, described a consistent pattern of mind-body reactions in 1926. He referred to this pattern as the rate of ''wear and tear'' on the body and coined the term *stress* which refers to the general response of the body to any demand placed upon it. The demand Selye referred to as the *stressor*. The stressor leads to the *stress response*. The stress response, in turn, leads to stress related disease (see Fig. 3). It must be noted that not all stress is negative; stress arousal can motivate superior performance. Selye said that there is positive stress, and only when stress moves to dysfunction, he referred to it as *distress*.

Fig. 2. Miners exiting underground mine wearing emergency breathing apparatus.

A stressor can be either *psychosocial* or *biogenic*. Psychosocial stressors are environmental events wherein the individual's interpretation plays a key role in the onset of the stress response. In fact, recent research with a specific population of accountants suggests that interpretational mechanisms play what may be the primary role in occupational stress and illness (Smith and Everly, 1992). Biogenic stressors are stimulants such as caffeine, nicotine, amphetamines, phenylpropanolamine and theophylline; they initiate the stress response directly. Both psychosocial and biogenic stressors initiate the stress response, but psychosocial stressors do not *directly* cause the stress response; only those psychosocial stressors interpreted as threatening by the individual will initiate the stress response. It is not necessarily what happens to us; it is the meaning we give to the experience that makes the difference. Stress may be further categorized as either *cumulative stress* (eroding, i.e., the daily hassles) or *traumatic stress* (sudden, intense). In emergency management the focus is on the consequences of traumatic stress.

The human organism survives because of the maintenance of a normal internal balance referred to as homeostasis. A physical or psychological threat tends to disrupt homeostasis and produce physiological reactions in the body. These physiological reactions involve the nervous and endocrine systems and produce various system, and organ responses. Specifically, stress leads to activation of the autonomic nervous system and to an increase or

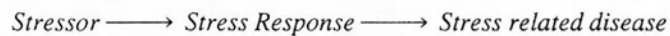*Stressor* ⟶ *Stress Response* ⟶ *Stress related disease*

Fig. 3. The Stress Response

decrease in secretions of various hormones in the body (Asterita, 1985). The response to a perceived threat or danger is sometimes referred to as the "fight or flight" response. When we are under duress, our hearts beat faster and blood is diverted to the skeletal muscles; one may experience shock; temperature, blood pressure and respiration rate remain high; there is a sudden outpouring of hormones; the throat becomes dry, digestion stops and the eyesight improves (Myers, 1992; Selye, 1993). This response was useful to our early ancestors in their efforts to survive dangerous animals, human enemies, and other conditions of primitive environments. In today's societies, the dangers may differ but can be equally severe and more complex. Modern humans are besieged with overlapping stressors and the constant response to them creates wear and tear on the mind and body (cumulative stress). In addition, emergency workers may be exposed to sudden intense stressors (traumatic stress). Both interrupt homeostasis and result in consequences for the individual.

3. The rationale for inclusion

The National Institute for Occupational Safety and Health (NIOSH) in the United States identifies occupational stress as one of the principal social and occupational health concerns of the 1990's. In response, NIOSH has developed a multipoint strategy for the control of stress in the workplace and has joined forces with the American Psychological Association to translate the strategy into practical action (Keita and Sauter, 1992). The National Council on Compensation Insurance notes that excessive stress accounts for about 14% of all occupational disease compensation claims (McCarthy, 1989). The number of stress-related worker compensation claims being filed across the United States is skyrocketing. The US Department of Commerce in 1990 reported that claims nearly doubled from $13.6 billion in 1980 to $24.7 billion in 1987 and are expected to top $90 billion by the turn of the century (Keita and Sauter, 1992). Work-related stress claims are the fastest growing and most costly per incident among claims affecting American commerce (Everly and Mitchell, 1992). The total financial cost of extreme stress to business and industry is difficult to document but estimates place it between $100 and $150 billion per year; 600,000 workers, moreover, are disabled each year for reasons of psychological disorders (Keita and Sauter, 1992; Miller et al., 1988).

Some workers, through conditions or choice of occupation, place themselves in stressful situations at a higher frequency rate than other workers (Heltzer et al., 1987). Emergency personnel such as mine rescue teams, firefighters, police, hospital emergency room personnel, paramedics, and workers called on to respond to disasters fall in this category. These workers are at high risk of experiencing disabling occupational stress reactions and, at the extreme, for a diagnosis of Post Traumatic Stress Disorder (PTSD) (Everly and Mitchell, 1992). PTSD is considered to be the most severe and disabling variation of occupational stress. The general public became aware of Post Traumatic Stress Disorder after the Vietnam War, when soldiers were reporting symptoms of a duration and intensity that called for medical intervention. PTSD is a medical diagnosis recognized in 1980 by the American Psychiatric Association and described in the 1994 Diagnostic and Statistical Manual of Mental Disorders (DSM IV), the medical diagnostic manual for psychiatric disorders. Symptoms associated with PTSD include flashbacks or nightmares, reliving of events,

exaggerated startle responses, sleep disturbances, detachment or avoidance of close, inter-personal relationships, feelings of guilt, high levels of anxiety and depression, and impair-ment of concentration and memory (Rundell et al., 1989).

By definition, a traumatizing event is one that is outside the normal range of everyday life events. It is experienced by the individual as devastating (Doepel, 1991). Traumatizing events or *critical incidents* are especially frequent among emergency workers. A critical incident is one experienced by personnel that produces an emotional reaction with the potential for inhibiting a worker's ability to function either at the scene or at a later time. The individual's coping mechanisms are overwhelmed. An example of a critical incident for an individual would be the serious injury or death of a colleague in the line of duty or an incident where the circumstances, the sights, sounds and smells are so distressing as to result in an immediate or delayed reaction. Examples of potentially traumatizing critical incidents for a community would be an earthquake, hurricane, fire, flood, large-scale envi-ronmental pollution, multiple injury/fatal accident, terrorism, child related traumatic events or homicides in the community (Mitchell and Everly, 1993).

Researchers have identified both immediate and long range symptomatic reactions to trauma (Doepel, 1991). Initially, individuals will report numbness, denial, avoidance of places or things that remind them of the trauma, withdrawal from social interaction, depres-sion, difficulty with concentration and relationships. Long range, more acute symptoms include fearfulness, irritability, sleep disturbance, and flashbacks. These responses can fluctuate within an individual and be confusing and disturbing to the individual, his family, and co-workers. Although researchers and psychologists who specialize in job stress gen-erally agree that persons attracted to emergency work are, as a group, basically more emotionally stable than the general population, emergency workers are, however, subject to an increased incidence of stress-related diseases (Dunning and Silva, 1988). Post trauma reactions are natural — though not necessarily healthy — responses to trauma, and they can be resolved. There is consensus among clinicians and researchers that the presence of a supportive environment is crucial to a positive resolution for the traumatized worker (Doepel, 1991). Successful resolution of the crisis experience not only allows for the worker's return to productive work but can help him or her better understand a normal response to an atypical situation. Emergency Service personnel generally are normal indi-viduals responding to abnormal situations. Critical Incident Stress Debriefing is an organized approach to the management of the stress reaction.

4. Background

Throughout history there are references to human stress in traumatic situations. It has been suggested that Critical Incident Stress Debriefing intervention evolved from four major influences: military experiences, police psychology, emergency medical services and dis-asters. Stress reactions during war have been reported by historians since 603 BC (Mitchell, 1988). Thousands of combat stress victims were reported during the American Civil War and among American service personnel in the two World Wars. Police psychologists entered the emergency services in the mid 1960's and they have contributed knowledge about the personality profile of the emergency worker and recommendations concerning the provision

of psychological support services. Emergency medical service agencies began developing support services in 1972; the first programs were in trauma centres and large hospitals. In 1983, after nine years of ground work, Mitchell (1985, 1988, 1993) introduced Critical Incident Stress Debriefing (CISD). He formed CISD teams made up of trained mental health professionals and specially trained peer support personnel drawn from the ranks of the emergency services. In a 1985 survey of 360 emergency workers from four states, 87% of the emergency responders stated that they had been emotionally and physically stressed by their work; 93% felt that the debriefings were helpful.

5. Intervention

A Critical Incident Stress Debriefing team is peer-driven and guided by a mental health professional. Its' work is confidential. CISD teams function in three areas: pre-incident, incident, and post-incident.

5.1. CISD pre-incident

The pre-incident functions are mainly educational. Included are instruction on stress recognition and stress reduction and the differences between non-emergency stress and critical incident stress. Instruction is provided to both the workers and the management/command staff. Emergency managers need to be included in the instruction and become informed about the capabilities and the limitations of CISD Teams and how to initiate services. Stress management protocols for use during an incident can be invaluable. They provide guidelines for optimal length of work time, frequency of rest periods, maximum time at the scene, food, shelter and use of a CISD team. In addition, the provision for spouse and family education programs can provide significant support to the emergency worker. This first phase of the program, focused on education, is a key component of the intervention. The more information people have about stress, the better they can recognize it in themselves and others, and seek help. Pre-incident programs provide emergency workers with information to help prepare for their own responses during an incident and understand that the intensity of their feeling is normal in an abnormal circumstance, and will resolve with time. Pre-incident education can lessen the need for post-incident allocation of resources for rehabilitation.

5.2. CISD during an incident

CISD ''during a critical incident'' is defined as the time surrounding the emergency and includes activities within twelve hours after an emergency worker leaves the scene. During the incident a debriefing team provides on-scene assistance to personnel who are obviously distressed. The team also may provide *defusings* which are shorter, unstructured debriefings that encourage a brief discussion of the events. These can significantly reduce acute stress. Defusings are done one to three hours following the event and may last up to one hour. If a defusing is not achieved within twelve hours, a full formal debriefing within three days of the incident is recommended. In large disasters, where many people are involved, after

an emergency team disengages from the scene, participants meet with mental health professionals and are given information on the typical effects of critical incident stress and the symptoms which may or may not appear. They are given practical suggestions for stress management and allowed time to comment or ask questions. This intervention is referred to as a *demobilization*. An example of the information and behavioral stress reduction suggestions offered at a demobilization might include the fact that a cup of coffee contains 150 mg of caffeine (tea contains 50–60 mg). Caffeine is a biogenic stressor known to cause stress arousal. It is believed that dosages in the 200–300 mg over several hours (3–6 hr) can be excessive for certain individuals and can contribute to anxiety and stress-related symptoms (Girdano et al., 1993). Thus, a recommendation to avoid caffeine (coffee, tea, colas, chocolate, etc.) might be presented by the CISD team.

5.3. Post-incident CISD

For about 24 hours after an incident, when defusings or demobilizations are complete, emergency personnel typically prefer not to discuss the event with outsiders. Emergency personnel may focus on reports and procedure, not being ready to deal with their feelings about the event (Mitchell, 1985). As stated earlier, CISD is a psychological and educational support group discussion that utilizes a specially trained team composed of a mental health professional and peer support personnel. A CISD team after a mining disaster would be composed of a mental health professional and mine rescue team members who have been trained in CISD. The CISD is a carefully designed, structured process that progresses through seven phases and provides stress-reduction information. Participants are encouraged, but not required, to speak; the process is confidential. The overall objective of the debriefing process "is to mitigate the impact of stress and restore the personnel to normal functions as quickly as possible" (Mitchell and Everly, 1993, p. 85).

Responders to emergencies are not always trained or experienced personnel. Sometimes they are individuals who simply are "there" and enlisted to perform a task. In a mine fire, rank and file miners from other areas may be called upon to execute emergency assignments and consequently be exposed to critical incidents. An example of this assumption of roles in an emergency, is found in a US Bureau of Mine's case study of workers' escape from an underground mine fire (Kowalski et al., 1993). The fire was discovered by the "fire boss" (mine examiner) who disengaged the trolley power and called to warn the shift foreman and the miners working in the three sections which were affected by the fire. The fire boss, joined by the mine foreman and the general assistant foreman, fought the fire and extinguished it about an hour after discovery. Meanwhile, twenty-some miners escaped under smoke. There was no time for a mine rescue team to organize and respond. The individuals on the scene reacted to fight the fire and to execute the escape. All individuals called upon to fulfil emergency roles should be included in debriefings.

5.4. Follow-up

All defusings, demobilizations and debriefings are followed up in some manner ranging from a phone call to a follow-up meeting. The form of the follow-up is dependent on individual and group needs as discerned by the CISD team during the intervention. CISD

formal training is essential for the peer support personnel and the team leaders. Team leaders are mental health personnel or members of the clergy. It takes a special task force six months to a year to organize a CISD team which is generally a volunteer group and needs to be carefully recruited, trained, and committed to the process. Appropriate follow-up after a critical incident allows closure of the event for the emergency responder.

6. Conclusion

Critical Incident Stress Debriefing teams have grown remarkably in the past ten years. The Third World Congress on Stress Trauma and Coping in the Emergency Services Professions, held in 1994 in Baltimore, MD attracted attenders from all over the United States and abroad. In November of 1994 there were approximately 350 CISD teams world-wide. The studies cited here suggest that those responsible for the development and implementation of crisis management plans need to be aware of the importance of including resources for meeting the critical incident stress needs for their rescue workers. They emphasize the importance of the intentional creation of pre-incident education programs and a post-trauma workplace milieu that is conducive to healthy resolution of the trauma.

Management personnel are not exempt from critical incident stress syndrome. As suggested earlier, in the present information age, technology can provide almost instant details of the emergency scene to the command personnel. Doepel (1991) has reported that managers are vulnerable to traumatic stress reactions and need to be offered training and information with the rest of the emergency personnel. His experience suggests that management, whenever possible be involved in the group process. He concludes that a good emergency plan ''is enhanced by the inclusion of components designed to mitigate the effects of post-traumatic stress reactions among managers and employees'' (p. 186).

The following are steps for incorporating the human stress factor in emergency/rescue work into an emergency plan:

1. Develop a collaboration between mental health personnel and emergency service personnel. Mental Health personnel should be included in emergency planning (Hartsough and Garaventa-Meyers, 1985).

2. Develop an educational program for workers and their families including information on critical incident stress and interventions (Mitchell, 1988). Include workers and managers in your program (Doepel, 1991).

3. Allocate resources, time and space for a debriefing process to be conducted by trained personnel (Mitchell, 1988).

4. Provide for follow-up and support after the event.

This paper has considered the human stress factor in the work of emergency personnel and discussed Critical Incident Stress Debriefing as an intervention. Quarantelli (1985) noted in the disaster research, that we are far from certain how much any of us understands about the nature of disasters, the nature of mental health, and the relationship between the two. The initial step is to recognize how significant that relationship may be.

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