

## **DEEP IMPACT OF STRESS ON CARDIOVASCULAR DISEASES**

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*Add to death and taxes the certainty of disasters.  
Edward D. Frohlich and Robert S. Schwartz*

It's widely known that common stress reactions (CSR) to disaster include a variety of physical and cognitive effects as well as emotional and interpersonal effects. Physical effects of CSR to disaster are fatigue, sleep disturbance, "hyperarousal", somatic complaints, impaired immune response, headaches, gastrointestinal and libido problems, "startle response". Cognitive effects of CSR to disaster are impaired concentration and/or decision-making ability, memory impairment, disbelief, confusion, distortion, decreased self-esteem/efficacy, self-blame, intrusive thoughts and memories, worry. Emotional effects of CSR to disaster are shock, anger, despair, emotional numbing, terror, guilt, grief of sadness, irritability, helplessness, loss of derived pleasure from regular activities, dissociation (e.g. perceptual experience seems "dreamlike", "tunnel vision", "spacey," or on "automatic pilot"). Interpersonal of CSR to disaster are alienation, social withdrawal, increased conflict within relationships, vocational and school impairment [1].

People who experience extreme posttraumatic stress symptoms (i.e., those symptoms that occur during or immediately after a traumatic disaster experience) are at the greatest risk for delayed or chronic post-traumatic problems such as post-traumatic stress disorder (PTSD) and other anxiety disorders, major depression, and substance abuse. Extreme posttraumatic stress symptoms are disso-

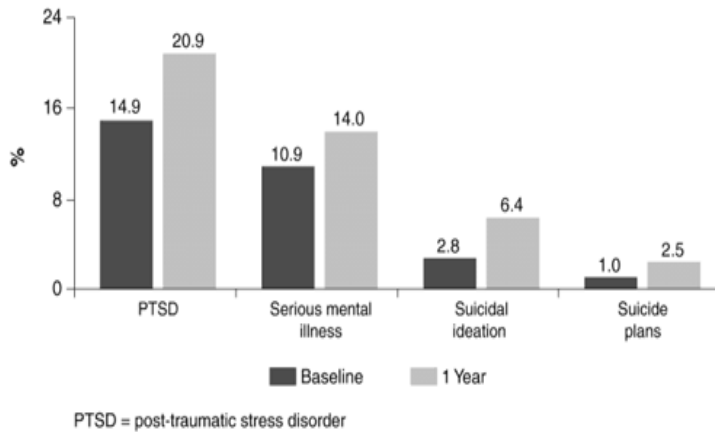
ciation (depersonalization, derialization, fugue states and amnesia), intrusive re-experiencing (flashbacks, terrifying memories or nightmares, repetitive automatic re-enactment), avoidance (agoraphobic-like social withdrawal), “hyperarousal” (panic episodes, startle reactions, fighting or temper), anxiety (debilitating worry, nervousness, vulnerability or powerlessness), depression (anhedonia, worthlessness, loss of interest in most), problematic substance use (abuse of dependency, self-medication), psychotic symptoms: delusions, hallucinations, bizarre thoughts of images, catatonia) [2].

Several large-scale disasters have provided important insight into the impact of extreme stress experiences. In 2005, Hurricane Katrina and subsequent flooding that inundated 80% of the city led to the displacement of approximately 400 thousands residents in just the New Orleans area. The confirmed death toll was 1,836 people, mainly from Louisiana (1,577) and Mississippi (238), with an additional 705 people categorized as missing in Louisiana [3].

In one study, a representative sample of 815 prehurricane residents of the areas affected by Hurricane Katrina was interviewed 5-8 months after the hurricane and again one year later [4]. Whereas post-disaster mental health problems typically decrease with time, prevalence increased significantly over time for PTSD, serious mental illness, suicidal ideation, and suicide plans (Figure 1).

Another report suggested that the slow recovery and failed rebuilding after Katrina set off a "mental health crisis" in the Gulf area [5]. Outcomes were only weakly related to sociodemographic variables [3], meaning that high prevalence of hurricane-related mental illness remained widely distributed in the population 2 years or more after the hurricane. Natural disasters also may be followed by increases in myocardial infarction (MI). The 1995 Kobe earthquake (known as the Hanshin-Awaji earthquake in Japan) killed 6,434 people and resulted in a three-fold increase of MI in people living close to the epicenter, particularly in women, and a near doubling in the frequency of strokes [6]. One analysis of 15 patients on 24-hour Holter monitoring at the time of a major earthquake

### Prevalence of Post-Disaster Mental Disorders Increased Over Time Following Hurricane Katrina



**Figure 1**

found derangement of heart rate variability during the catastrophic event, suggesting one possible mechanism for increased heart attacks [7]. There is evidence, too, that acute catastrophic psychological stress caused by the Kobe earthquake disrupted diurnal cardiovascular variability [8]. This earthquake-induced nondipping might also be related to the nighttime onset of cardiovascular events. Besides acute events, such as MI, one of the biggest health care challenges following a widespread disaster is meeting the needs of patients with chronic disease. In the New Orleans-Metairie-Kenner, LA, metropolitan area, for example, the prevalence of diabetes was about 9.0%, angina or coronary heart disease 4.6%, previous MI 3.0%, prior stroke 2.0%, and current asthma in 6.3% at the time of Hurricane Katrina [9]. Overall, about 25.4% of adults (or an estimated 233,876 people) had at least one of these conditions. Finally, changes in behaviors that affect the risk for chronic diseases may occur in the wake of disasters. For example, the U.S. Centers for Disease Control and Prevention noted that individuals in Con-

necticut, New Jersey, and New York increased smoking and consumption of alcohol following the September 11, 2001 attacks on the New York City World Trade Center [10].

**Conclusion.** Add to death and taxes the certainty of disasters. Each day disasters occur, affecting millions of people each year. Whether natural or human-made, the extreme and overwhelming forces of disaster can have far-reaching effects on individuals, local communities, and national stability. Though disastrous events may last from seconds to days, effects can continue from months to years. In the case of the 1972 Buffalo Creek dam collapse in West Virginia, for example, when survivors were examined 14 years later using standard diagnostic criteria, 25% had PTSD. Approximately 25-30% of individuals exposed to unusually traumatic events such as disasters, combat, violence, and accidents develop chronic PTSD or other psychiatric disorders. Factors associated with the Highest Risk for Extreme Posttraumatic Stress:

1. Life-threatening danger, extreme violence, or sudden death of others;
2. Extreme loss or destruction of their homes, normal lives, and community;
3. Intense emotional demands from distraught survivors (e.g. rescue workers, counselors, caregivers);
4. Prior psychiatric or marital/family problems (e.g. divorce, job loss, financial losses);
5. Prior significant loss (e.g., death of a loved one in the past year).

In general, the greater the perceived life threat, the greater the personal injury, and the greater the sensory exposure to distressing sights, sounds, and odors, the more likely PTSD will manifest. Victims are not the only ones at risk. Helpers, including medical, morgue, and security personnel and rescue, fire and safety workers, also may experience either direct or indirect traumatization. Family members of victims, too, are at risk for what has been referred to as vicarious traumatization-relationships with traumatized individuals

can create much distress for others.

**Key concepts.** *Stress reactions, posttraumatic stress symptoms, cardio-vascular diseases, Mechanism of the self regulation.*

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### **ՍԹՐԵՍԻ ՊԱՏՃԱՌՈՎ ՄԱՐԴՈՒ ՍՐՏԱՆՈԹԱՅԻՆ ՀԱՍԱԿԱՐԳԻ ԽԱԹԱՐՈՒՄԸ ԵՎ ԻՆՔՆԱԿԱՐԳԱՎՈՐՄԱՆ ՄԵԽԱՆԻՉՄՆԵՐԸ**

#### *Ամփոփում*

Հողվածում վերլուծվում են սթրեսի պատճառով մարդու սրտանոթային համակարգի խաթարման հետևանքները և օրգանիզմի ընդհանուր հակազդումների մեխանիզմները: Տարերային մեծ աղետների ժամանակ սրտամկանի ինֆարկտների հաճախությունը եռապատկվում է, իսկ ինսուլտներինը՝ կրկնապատկվում: Բացի դրանից, աղետի ժամանակ իրականում ավելանում է սրտի ռիթմի փոփոխականությունը, որն իր հերթին պատճառ է դառնում իշեմիկ նոպաների առաջացման զգալի ավելացման: Համանման հակազդումներ են առաջանում նաև խոշոր ահաբեկչությունների ժամանակ: 2001թ. սեպտեմբերի 11-ի նյույորքյան դեպքերից հետո ահաբեկչության ենթարկված օբյեկտների շրջակա տարածքներում կտրուկ ավելացել է բնակչության կողմից ակոհոլի և ծխախոտի սպառումը:

Թեև աղետները տևական չեն լինում, սակայն դրանց հետևանքները, հատկապես առողջապահության տեսակետից, զգացնել են տալիս հետագա բազում տարիների ընթացքում:

**Առանցքային հասկացություններ. սթրեսի հակազդում, հետ-տրավմատիկ սթրեսային ախտանիշ, սրտանոթային հիվանդու-թյուններ, ինքնակարգավորման մեխանիզմ:**

**П. М. СЕНАН, А. В. АСТВАЦАТРЯН**

**РАССТРОЙСТВО СЕРДЕЧНО-СОСУДИСТОЙ  
СИСТЕМЫ ЧЕЛОВЕКА В СЛЕДСТВИИ  
ВОЗДЕЙСТВИЯ СТРЕССА И МЕХАНИЗМЫ  
САМОРЕГУЛЯЦИИ**

*Резюме*

В статье рассмотрены расстройства сердечно-сосудистой системы, вследствие воздействия стресса и механизмы противодействия ему со стороны организма. Также приведена классификация общих реакций организма на стресс. На примере стихийных бедствий показано, что некоторые из них сопровождаются трехкратным увеличением частоты инфаркта миокарда и двукратным увеличением инсультов. Кроме того, во время катастроф, достоверно увеличивается вариабельность сердечного ритма, что в свою очередь, является одной из причин увеличения ишемических атак. Во многом схожие реакции происходят при крупных террористических атаках. Примечательно, что после Нью-Йоркских событий 11 сентября 2001 года наблюдается резкий скачок потребления алкоголя и табака в местах террористических атак. Хотя катастрофические события длятся от нескольких секунд до нескольких дней, последствия их ощущаются годами.

**Ключевые понятия:** *реакции на стресс, посттравматический стрессовые симптомы, сердечнососудистые заболевания, механизм саморегуляции.*