

Psychological Trauma, Physical Health and Somatisation[†]

V Ng,*^{BSc (Hons), M Psych}, A Norwood,**^{MD}

Abstract

The aim of this review is to examine the relationship between trauma, physical health and somatisation. A search was made on the Procite Database at the Department of Psychiatry at the Uniformed Services University of the Health Sciences for research articles with the following key words: posttraumatic stress disorder, somatisation, trauma (the Procite Database holds more than 15,000 articles related to trauma and disaster). A review of the current research findings show a link between prior exposure to traumatic events (such as war, disaster, motor vehicles and industrial accidents, crime and sexual assault, domestic violence and child abuse) and subsequent physical health and medical care utilisation. Possible mechanisms and conceptualisations which may explain the association between trauma and physical health, such as high-risk health behaviours, neurobiology, alexithymia and culture are discussed. Because traumatised persons show high medical utilisation, good screening, thorough assessment, empirically-based treatment and appropriate referral of such patients are essential.

Ann Acad Med Singapore 2000; 29:658-64

Key words: Abuse, Alexithymia, Disaster, Illness, Medical utilisation, Neurobiology, Posttraumatic stress disorder

TRAUMATIC EVENTS AND PHYSICAL WELL-BEING

Trauma does not respect persons or culture. While Singapore is fortunate to have been spared large-scale disaster and war for decades, it has nevertheless had its share of traumatic incidents. The Spyros explosion on 12 October 1978, which claimed the lives of 76 workers and injured 100 more, resulted in the greatest number of casualties recorded in a single incident involving the ship-building and ship-repairing industry in Singapore. Equally tragic was the collapse of Hotel New World on 15 March 1986, burying 50 people and ending with a final death total of 33. More recently, the Silkair MI 185 crash on 19 December 1997, which killed all 104 people on board, resulted in nation-wide mourning and a memorial service attended by 8500 people. While disasters are few and far between, on a daily basis, trauma enters the private lives of individuals through crime, tragic accidents, domestic violence, and childhood abuse. A recent subordinates courts survey found that, since 1995, the number of applications for personal protection and exclusion orders (PPO) has been increasing at an average annual rate of 44% from 987 cases in 1995 to 1306 in 1996 to 2019 in 1997.¹ It

was estimated that, in 1998, the figure would have jumped by nearly 30%, to about 2600 cases.

A growing body of research demonstrates a remarkable consistency in human response to overwhelming and uncontrollable life events. Although most people exposed to traumatic events, even the most severe, will do well over time, some may manifest psychological symptoms such as nightmares, intrusive thoughts, and flashbacks, as well as physical and behavioural sequelae. In addition to increased rates of depression and anxiety, childhood and adult trauma is also associated with poorer physical health and higher rates of medical utilisation.

This article reviews the current research findings on medical illness as a trauma outcome, in particular the association between prior exposure to traumatic events and subsequent physical health, somatisation and medical care utilisation. Several mechanisms that may explain the association between trauma and physical health are discussed.

Somatisation refers to the clinical presentation of bodily symptoms in place of emotional or psychological distress. There exists a close association between physical health, somatisation and post-traumatic stress disorder (PTSD).²

* Visiting Fellow

** Professor and Acting Chairperson
Department of Psychiatry

F. Edward Hébert School of Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA

Address for Reprints: Dr Vivienne Ng, Department of Psychology, Institute of Mental Health, 10 Buangkok View, Singapore 539747.

[†] The opinions expressed in this paper are those of the authors and do not necessarily reflect the opinions of the Uniformed Services University of the Health Sciences, the US Department of Defense or the Department of Psychology at the Institute of Mental Health.

Recent research suggests that PTSD may be an important mediator through which trauma may be related to negative physical health outcomes.³ In the Diagnostic Statistical Manual for Mental Disorder (4th edition) field trials for PTSD,⁴ it was found that somatisation rarely occurred in the absence of histories of severe trauma.

War

The earliest evidence on the relationship between trauma and health involved war veterans. As far back as the First World War, there were reportedly many cases of hysterical blindness, mutism and paralysis. Numerous studies dating back to the 1940s have documented somatisation as a result of war and disasters.⁵ Studies showed that war veterans with PTSD reported more health problems and poorer health in general than controls.⁶ The most recent war-related phenomenon to emerge is the Gulf War Syndrome. Despite the lack of consistent medical explanations, Gulf War veterans report significantly greater prevalence of chronic fatigue, cognitive dysfunction, bronchitis, asthma, fibromyalgia and sexual discomfort as well as depression, anxiety disorder, alcohol abuse and PTSD, compared to controls.⁷

Disasters

Reports of poorer physical health and increased medical utilisation have also been observed in disaster victims. In a prospective study of the prevalence of somatisation symptoms among community residents after a natural disaster in Puerto Rico, it was found that exposure to the disaster was related to a higher prevalence of medically unexplained physical symptoms, particular gastrointestinal ones (abdominal pain, vomiting, nausea, excessive gas) and pseudoneurological ones (amnesia, paralysis, fainting, unusual spells/double vision).⁸ There are to-date no Singaporean studies specifically measuring somatic complaints as a result of exposure disaster. However, a study by Long and Teo⁹ on the psychological reactions and post-traumatic stress disorders observed in the Hotel New World disaster revealed that 2 of the 11 survivors interviewed had somatic complaints.

Disaster victims are not the only ones who suffer psychological and physical distress in the aftermath of a catastrophe. Military family assistance officers who were in contact with grieving family members of the United States Army airplane crash in Newfoundland in 1985 reported poorer health up to a year after the incident.¹⁰ There was a robust dose-response relationship between severity (intensity and duration) of the officer's exposure to survivor stress and the magnitude of self-reported physical symptoms or illnesses. Similarly, body handlers exposed to traumatic death after the USS Iowa gun turret explosion reported more intrusion, avoidance, hostility and

somatisation at 1 month than did non-body handler volunteers.¹¹ In the SilkAir disaster in Singapore, Singapore Airline "buddies", Emergency Behaviour Officers (EBOs) and the Ministry of Health's CARE (Caring Action in Response to Emergency) team members helped out with the families of the deceased. 13.5% of this group indicated medical problems 6 months after the event (Pang E—unpublished data).

Accidents

While large-scale and high-impact events like war and disaster are infrequent and not likely to have been experienced by the Singaporean born in the relatively peaceful years following World War II and the 1969 riots, road traffic and industrial accidents are relatively common.

In one 7-year follow-up study of child survivors of a bus-train collision, highly exposed subjects were found to exhibit the highest levels of somatisation, depression, and phobic anxiety, psychoticism. They also had more PTSD symptoms than others, and reported higher help-seeking behaviour during their military service.¹²

Somatoform disorder, the most common being pain disorder, has been found to occur in about 3% of people who sustain physical injury in civilian accidents.¹³ This figure is elevated in patients in the process of litigation or compensation.¹⁴ Somatoform pain after physical injury is most often related to current psychosocial problems or conflicts.¹⁵ According to Malt, chronic pain problems have reportedly been caused by whiplash injuries, but the aetiology is controversial as there is usually no definite neurological damage.

Somatisation responses are also common after industrial injury. Ford¹⁶ described a severe somatisation syndrome with total disability that he termed the "Humpty Dumpty" syndrome. These sufferers were usually older, of limited education and vocational flexibility, and had been described as hard-working prior to the accident. He postulated that the counter-dependent defenses of these older workers crumpled with the temporary enforced dependency of an acute but potentially recoverable injury.

Symptoms reported after accidental injury include fatigue, weakness, pain and aches, decreased performance and concentration difficulties.¹⁷ Sometimes, multiple unexplained physical symptoms may be found, suggesting a diagnosis of "undifferentiated somatoform disorder". In most cases, there is a previous history of somatisation under stress.

Crime and Sexual Assault

Incidents of crime, violence and sexual assault are especially powerful psychological traumas in that they involve a perpetrator who intentionally directs a hurtful act

at the victim, and in so doing, dispels the illusion of personal safety. While the crime rate is generally low in Singapore, there was an increase in 1998, the first time after 9 consecutive years of decline. The total number of seizable offences increased by 5.2% to 48,260 cases. The crime rate per 100,000 total population was 1258 cases – 1.6% higher than in 1997.¹⁸

There have not been any studies in Singapore directly examining the impact of the rape on victims' health and use of medical services. However, Ward and Inserto,¹⁹ in their book "Victims of Sexual Violence", cited a number of local case histories where victims had somatic problems, such as extreme preoccupation with health concerns, exaggerated startle responses some 30 years after the incident, sexual difficulties, illness, headaches, irritability, weakness and muscular tension.

In a United States study of rape among adolescent women, many victims later sought medical care for headaches, dizziness and abdominal pain, but did not appear to perceive any link between their sexual assault and their symptoms.²⁰ In Golding's²¹ study examining the association between lifetime sexual assault history and lifetime somatic symptoms in 1610 randomly selected women, women who had a history of sexual assault were found to have poorer health perceptions, more functional limitations and a greater frequency of both medically explained and unexplained symptoms. Survivors of crime show increased health care utilisation after victimisation, relative to before victimisation.²² Studies have found that rape victims report significantly more physical complaints and higher non-psychiatric medical utilisation than controls up to one or two years following an attack. While somatic symptoms diminish over time, medical health care seeking remained elevated.²³

Domestic Violence

According to the Singapore subordinate courts survey, the number of orders for court protection from family abuse has been increasing annually.¹ Spousal violence accounted for 89% of the cases in 1997, followed by 2.8% child abuse. Domestic violence has been known to lead to a "battering syndrome", in which physical assault is followed by an increase in general medical symptoms and emotional problems. While the Singapore study did not look at health outcomes and medical utilisation specifically, it found that about 60% of victims of family violence in 1997 sustained physical injuries, with bruises and swelling being the most common forms. 2.1% of injuries were serious enough to require hospitalisation and stitches or resulted in unconsciousness of the victim. Fear was the most prominent emotional response of the victims (63%). Forty per cent felt a sense of helplessness, not knowing who or where to turn

to whenever they were abused. Seventeen per cent had low self-esteem and 11% had suicidal tendencies.

In one American study, violence against women, both domestic and non-domestic, was the most powerful predictor of physician visits and outpatient costs.²² Compared to controls, battered women are more likely to receive medical assistance, report more physical symptoms, have higher scores on depression, anxiety and somatisation, are more likely to abuse drugs and alcohol, are more likely to have attempted suicide, and visit the emergency department more frequently.^{22,24} A wide range of symptoms are associated with current abuse: loss of appetite, frequent or serious bruises, nightmares, vaginal discharge, eating binges or self-induced vomiting, diarrhoea, broken bones, sprains or serious cuts, pelvic or genital pain, fainting or passing out, abdominal or stomach pain, breast pain, frequent or severe headaches, difficulty in passing urine, chest pain, problem with sleeping, shortness of breath and constipation have all been reported. In addition to admissions relating directly to their assaults, victims of domestic violence had more hospital admissions for non-traumatic surgical disorders, gynaecological disorders, induced abortion, medical problems and suicide attempts than matched controls.²⁵ This was true up to 5 years following the battering.

Childhood Abuse

Most of the cases of abuse reported to the Ministry of Community Development in Singapore involve physical abuse.²⁶ The subordinate courts survey in 1998 found that children were affected by family violence in 4 out of 10 cases.¹ More than half (55%) were threatened and 68% actually got hurt. Again, while this study did not specially look at health-related problems, 20% of children were found to have behavioural problems, 20% showed signs of violent behaviour, and 5% had sleep problems.

Studies have shown that patients with a history of childhood abuse report a higher number of physical symptoms than never-abused patients. These physical symptoms include abdominal pain, irritable bowel syndrome and other gastroenterological symptoms, back, abdominal, pelvic or genital pain, gynaecological infections, urinary problems, breast pain, headaches, musculo-skeletal complaints, respiratory complaints, chronic fatigue, eating disorders and total number of physical complaints.²⁷⁻²⁹ For example, 66.5% of a sample of gastroenterological patients had experienced sexual and physical abuse.²⁸

McCauley and her colleagues²⁷ found no difference between the effects of sexual or physical abuse. Also, those who experience childhood abuse only do not appear to differ from those who experience abuse as adults in terms of physical symptoms, emotional distress, substance abuse

or suicide attempts. Not surprisingly, patients who reported both childhood and current or past adult abuse had the highest levels of psychological and physical problems compared with those who reported abuse only as a child or an adult.

A history of childhood abuse is strongly associated with pain disorders,²⁹ somatisation disorders,³⁰ conversion disorders,³¹ hypochondriasis³² as well as somatoform and factitious disorders.³³ In a study conducted in conjunction with the DSM-IV field trials for somatisation disorder,³⁰ 80% of 100 women with somatisation disorder reported being sexually abused as either children or adults. Compared with controls, adults diagnosed with hypochondriasis have been found to recall more sexual abuse, physical violence and major parental upheaval before the age of 17.³² Many researchers have also commented on the prevalence of childhood abuse in factitious disorders.³³ Such patients often make themselves ill and abuse their own bodies, attempting to gain control over confused doctors in a re-enactment of the abusive childhood relationship.

MECHANISMS AND EXPLANATIONS

Ford³⁴ lists several mechanisms that may explain somatic symptoms and poor physical health after trauma, among them:

- a) direct results of physical injury, such as a residue of war injuries or an industrial accident;
- b) direct brain injury; for example the symptoms of post-concussive syndrome include headaches, fatigue, dizziness;
- c) indirect brain damage caused by malnutrition such as the K-Z syndrome;
- d) physiologic components of emotional states (such as tachycardia due to anxiety);
- e) psycho-physiological processes that have been precipitated or exaggerated, such as irritable bowel syndrome, hypertension or asthma; and
- f) somatisation.

Kirmayer's similar but more psychologically-based explanations of the ways in which traumatic memory can be inscribed on the body include:

- a) psychophysiologically, as conditioned emotional responses, affectively state-dependent learning, persistent states of hyperarousal or other enduring changes in neuro-regulation;
- b) physically, as cases of other stigmata;
- c) as changes in habits, postures, stances or carriage of the body;
- d) as changes in the body-self, that is, in feelings of bodily safety, comfort, security and self-esteem;
- e) as changes in attention (for example, as heightened attention to the body or as denial of, or distancing from,

- the body through isolation of affect or dissociation;
- f) in the creation of images or metaphors that become central to self-description and experience;
- g) as narrative accounts of injury, loss and disfigurement that become part of the person's life story.³⁵

The many factors that may explain the correlation between trauma and physical health outcomes can be grouped under behavioural, neurobiological, psychological, and cultural explanations.

a. High-Risk Health Behaviours

There appears to be an association between traumatic exposure and negative health behaviours. Survivors of the Buffalo Creek disaster showed increased alcohol use, cigarette smoking and use of prescription drugs.³⁶ War veterans with PTSD also engaged in more frequent adverse health practices than those without PTSD.³⁷

In a survey study assessing sexual abuse history, health problems and behaviours among women, it was found that smoking behaviour, age at first intercourse, number of sexual partners before age 18 and teenage pregnancy were all significantly related to a history of abuse.³⁸ One of the reasons postulated for the risky sexual behaviours observed in survivors of childhood abuse is the lack of self-esteem and communication skills necessary to establish appropriate boundaries with sexual partners. Abuse survivors have been known to show a tendency toward re-enactment or revictimisation by people as adolescents or adults. It has also been argued that people who suffer from prolonged trauma are too focused on present survival to consider future health risks. Furthermore, those who are extremely depressed may be passively suicidal through their risky health behaviours.

b. Neurobiology

Rosen and Fields³⁹ proposed that neurochemical changes in the brain associated with PTSD might be aetiologically related to the long-term morbidity seen in trauma survivors. A recent Positron Emission Tomography scan study⁴⁰ showed that when people with PTSD are exposed to stimuli reminiscent of their trauma, there is an increase in perfusion of the right hemispheric regions associated with emotional states and autonomic arousal. Moreover, there is a simultaneous decrease in oxygen utilisation in Broca's area—the region in the left inferior frontal cortex involved in speech. These findings may account for the "speechless terror" that trauma induces in some individuals which interferes with the ability to put feelings into words, leaving emotions to be expressed by bodily dysfunction.

In a summary by Friedman and Schnurr,³ the best documented biological correlates of PTSD include enhanced cardiovascular reactivity, autonomic hyperarousal, disturbed sleep physiology, adrenergic dysregulation,

enhanced thyroid function and altered hypothalamic-pituitary-adrenal axis activity. Immunological disruption was found in victims of Hurricane Andrew months after the event.⁴¹ There is also a relationship between stress-induced cardiovascular abnormalities and somatic anxiety.⁴² Trauma survivors frequently have an exaggerated startle response. It is thought that the persistence of intrusive and repetitious thoughts, by means of the process of kindling, sets up a chronically disordered pattern of hyper-arousal. These physiological symptoms are then interpreted in a catastrophic fashion, resulting in excessive concern over somatic symptoms.

Given the above, the pathophysiology of PTSD may increase the risk of a number of medical illnesses. Kiecolt-Glaser and his colleagues⁴³ conclude that there appears to be “a convergence among cardiovascular, neuroendocrine and psychoneuroimmunological research and the evaluation of differences among people who vary in autonomic activation. A better understanding of these individual differences in response to stress could help identify those individuals who may be more prone to long-term health changes....(p 684)”. Data are now emerging on trauma’s effects on the immune system, with implications for the understanding and treatment of somatisation.

c. Alexithymia

It has been postulated that difficulty in symbolically expressing or transforming emotional experience, termed alexithymia, may contribute to psycho-physiological disorders.⁴⁴ Trauma induces a state of “speechless terror”. The intense emotions associated with a traumatic event may lead to a narrowing of attention and hence encoding of a limited range of idiosyncratic details of events.⁴⁵ The traumatic event may not be stored in declarative memory, but as strong emotions in an episodic sensory-affective memory. As such, many people experience bodily sensations but cannot recall or describe the actual event. Krystal⁴⁶ postulated that trauma results in a “de-differentiation of affect”—that is, a loss of ability to identify specific emotions to serve as a guide for taking appropriate actions. He noted that this inability to create semantic constructs to identify somatic states is related to the development of psychosomatic reactions and to aggression against self and others. Thus, the alexithymic construct links susceptibility to disease with prolonged states of emotional arousal. It focuses attention on deficits in cognitive processing of emotions which remain undifferentiated and poorly regulated.

Rape victims have been found to be more alexithymic than a non-traumatised comparison group, and victims with a history of more than one episode of rape are more alexithymic than those with a single episode.⁴⁷ Women

survivors of sexual abuse show elevated levels of many symptoms, including somatisation, dissociation, alexithymia and self-destruction.⁴⁸

Recent studies have documented that verbalisation of traumatic experiences, while distressing in the short-term, may lead to long-term improvements in psychosomatic symptoms and emotional well-being.⁴⁹ For instance, telling stories of personal trauma, while immediately stressful, have been found to be healing for holocaust survivors.⁵⁰ Conversely, among survivors of the Herald of Free Enterprise disaster, those with negative attitudes towards emotional expression showed poorer general physical and psychological health.⁵¹ However, it remains undetermined under what conditions talking about traumatic experiences can be helpful or, perhaps, harmful. The literature on the use of a procedure designed to facilitate talking about traumatic experiences, stress debriefing, is quite controversial.⁵²

d. Culture

While talking about traumatic experiences may be healing, cultural and religious ideals influence receptivity to, and the ultimate value of, expiation, confession, abreaction and self-assertion. The significance of a traumatic event involves relationships, commitments, social position and wider systems of cultural meaning and value. In a traumatic situation, a person experiences intense feelings of fear, terror and helplessness. Among most cultures in Asia, however, containment, equanimity and acceptance are viewed as strengths and marks of distinction. This strong tendency to control feelings⁵³ may leave victims unable to dissipate high levels of physiological arousal or engage them in a constant mental effort to suppress distressing emotions.⁵⁴ It is not surprising, then, that somatisation is particularly prevalent in Asian cultures. For instance, depressed South East Asian refugees with PTSD have been found to somatise their psychiatric problems.⁵⁵

In Singapore, as is true among most Asian cultures, the development of language to describe internal feeling states is not strongly emphasised. Thus, when asked how they are feeling emotionally, patients often launch into a list of physical complaints, and, even with prompting, many are unable to adequately articulate their feelings beyond “bad”, “pek-chek” (frustrated), or “sian” (bored). Many Singaporean victims of childhood physical or sexual abuse now look after ageing parents. As such, there may be a strong defensive need to feel pity toward their perpetrators and to deny any anger. Identification with the family or social group is a primary source of self-definition and self-worth. Hence, the strong need to protect the family name and the shame associated with “airing dirty linen in public” may stop many abuse sufferers from seeking appropriate

help. Because of the stigma associated with seeking psychiatric help, it may be more “culturally appropriate” to report multiple physical symptoms, to exhibit illness behaviours that guarantee help of some kind, and to even complain of stress rather than to seek therapy to resolve the psychological distress caused by traumatic childhood life events. However, many somatic symptoms, including those that might be attributed to PTSD, may represent culturally sanctioned idioms of distress that serve to draw attention to and comment on social problems.⁵⁶ As such, viewing distress exclusively in terms of individual pathology may undermine patients’ efforts to extricate themselves from oppressive circumstances.

CONCLUSION

The relationship between trauma, physical health and medical utilisation has important implications for the healthcare system in any country. Traumatized persons are likely to be heavy consumers of health care and increase the cost of providing good medical care. Because physical symptoms may mask the presence of PTSD in some patients, good screening, thorough assessment, empirically-based treatment and appropriate referral of such patients are essential. However, most medical providers in the United States⁵⁷ receive little or no training in this area currently, and this is likely to be true in Singapore as well. Increased teaching about the psychological and physical effects of trauma should be incorporated into undergraduate, post-graduate, and continuing medical education.

ACKNOWLEDGEMENTS

The authors would like to thank Dr Robert J Ursano, Professor and Chairperson of the Department of Psychiatry, F Edward Herbert School of Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA, for his support and advice in the preparation of the manuscript.

REFERENCES

1. A profile of family violence. Subordinates Courts Research Bulletin August 1998; 13:1-12.
2. McFarlane A C, Atchinson M, Rafalowicz E, Papay P. Physical symptoms in posttraumatic stress disorder. *J Psychosom Res* 1992; 38:715-26.
3. Friedman M J, Schnurr P P. The relationship between trauma, posttraumatic stress disorder and physical health. In: Friedman M J, Charney D S, Deutch A Y, editors. *Neurobiological and Clinical Consequences of Stress: From Normal Adaptation to PTSD*. Philadelphia: Lippincott-Raven, 1995:507-24.
4. van der Kolk B A, Roth S, Pelcovitz D, Mandel F. *Complex PTSD: Results of the PTSD field trials for DSM-IV*. Washington, DC: American Psychiatric Association, 1993.
5. Rundell J R, Ursano R J, Holloway H C, Silberman E K. Psychiatric responses to trauma. *Hosp Community Psychiatry* 1989; 40:68-74.
6. Wolfe J, Schnurr P P, Brown P J, Furey J. Posttraumatic stress disorder and war-zone exposure as correlates of perceived health in female Vietnam War veterans. *J Consult Clin Psychol* 1994; 62:1235-40.
7. The Iowa Persian Gulf Study Group. Self-reported illness and health status among Gulf War veterans: A population-based study. *JAMA* 1997; 277:238-45.
8. Escobar J I, Canino G J, Rubio-Stipec M, Bravo M. Somatic symptoms after a natural disaster. A prospective study. *Am J Psychiatry* 1992; 149:965-7.
9. Long F Y, Teo S H. Some observations of survivors’ psychological reactions and post-traumatic stress disorders in the Hotel New World disaster, Singapore. *The Singapore Psychologist* 1992; 4:2-18.
10. Bartone P T, Ursano R J, Wright K M, Ingraham L H. The impact of a military air disaster on the health of assistance workers. *J Nerv Ment Dis* 1989; 177:317-28.
11. Ursano R J, Fullerton C S, Kao T C, Bhartiya V R. Longitudinal assessment of posttraumatic stress disorder and depression after exposure to traumatic death. *J Nerv Ment Dis* 1995; 183:36-42.
12. Tyano S, Iancu I, Solomon Z, Sever J, Goldstein I, Touviana Y, et al. Seven-year follow-up of child survivors of a bus-train collision. *J Am Acad Child Adolesc Psychiatry* 1996; 35:1-9.
13. Malt U F. The long-term psychiatric consequences of accidental injury. *Br J Psychiatry* 1988; 153:810-8.
14. Mendelson G. Follow-up studies of personal injury litigants. *Int J Law Psychiatry* 1984; 7:179-88.
15. Malt U F. Psychiatric aspects of accidents and traumatic injuries. In: Seva A, editor. *The European Handbook of Psychiatry and Mental Health*. Vol II. Zaragoza: Prensas Universitarias de Zaragoza, 1991: 1349-61.
16. Ford C V. A type of disability neurosis: The “Humpty Dumpty” syndrome. *Int J Psychiatry Med* 1978; 8:285-94.
17. Malt U F, Blikra G, Hoivik B. The late effect of accidental injury questionnaire (LEAIQ). *Acta Psychiatr Scand* 1989; 80:113-30.
18. Singapore Police Force Annual Report. Crime Statistics:1998-1999. Singapore: Public Affairs Department, Singapore Police Force, 1999.
19. Ward C, Inserto F. *Victims of Sexual Violence: A Handbook for Helpers*. Singapore University Press Kent Ridge, 1990.
20. Felice M, Grant J, Reynolds B, Gold S, Wyatt M, Heald F P. Follow up observations of adolescent rape victims. *Clin Pediatr (Phila)* 1978; 17:311-5.
21. Golding J M. Sexual assault history and physical health in randomly selected Los Angeles women. *Health Psychology* 1988; 13:130-8.
22. Koss M P, Koss P G, Woodruff J. Deleterious effects of criminal victimization on women’s health and medical utilization. *Arch Intern Med* 1991; 151:342-7.
23. Kimerling R, Calhoun K S. Somatic symptoms, social support and treatment seeking among sexual assault victims. *J Consult Clin Psychol* 1994; 62:333-40.
24. McCauley J, Kern D E, Kolodner K, Dill L, Schroeder A F, DeChant H K, et al. The battering syndrome: prevalence and clinical characteristics in primary care internal medicine practices. *Ann Intern Med* 1995; 123:737-46.
25. Bergman B, Brisman B. A 5-year follow-up study of 117 battered women. *Am J Pub Health* 1991; 81:1486-9.
26. Chan R. *Child abuse—The situation in Singapore*. Singapore: Ministry of Community Development, 1987.
27. McCauley J, Kern D E, Kolodner K, Dill L, Schroeder A F, Dechant H K, et al. Clinical characteristics of women with a history of childhood

- abuse: unhealed wounds. *JAMA* 1997; 227:2363-8.
28. Irwin C, Falsetti S A, Lydiard R B, Ballenger J C, Brook C D, Drenner W. Comorbidity of posttraumatic stress disorder and irritable bowel syndrome. *J Clin Psychiatry* 1996; 57:576-8.
 29. Walker E A, Katon W J, Harrop-Griffiths J, Holm L, Russo J E, Hickok L R. Relationship of chronic pelvic pain to psychiatric diagnoses and childhood sexual abuse. *Am J Psychiatry* 1988; 145:75-80.
 30. Pribor E F, Yutzky S H, Dean T, Wetzel R D. Briquet's syndrome, dissociation and abuse. *Am J Psychiatry* 1993; 150:1507-11.
 31. Hendricks-Matthews M K. Conversion disorder in an adult incest survivor. *J Fam Practice* 1991; 33:298-300.
 32. Barsky, A J, Wool C, Bennett M C, Cleary P D. Histories of childhood trauma in adult hypochondriacal patients. *Am J Psychiatry* 1994; 151:397-401.
 33. Foulks D G, Houck C A. Somatoform disorders, factitious disorders and malingering. In: Stoudemire A, Fogel B S, editors. *Psychiatric Care of the Medical Patient*. New York: Oxford Univ Press, 1993:267-88.
 34. Ford C V. Somatic symptoms, somatization and traumatic stress: An overview. *Nord J Psychiatry* 1997; 5:5-13.
 35. Kirmayer L J. Confusion of the senses: Implications of ethnocultural variations in somatoform and dissociative disorders for PTSD. In: Marsella A J, Friedman M J, Gerrity E T, Scurfield R M, editors. *Ethnocultural Aspects of Posttraumatic Stress Disorder: Issues, Research and Clinical Applications*. Washington, DC: American Psychological Association, 1996.
 36. Gleser G C, Green B L, Winger C N. Prolonged psychosocial effects of disaster: A study of Buffalo Creek. New York: Academic Press, 1981.
 37. Shalev A, Bleich A, Ursano R J. Posttraumatic stress disorder: somatic comorbidity and effort tolerance. *Psychosomatics* 1990; 31:197-203.
 38. Springs F E, Friedrich W N. Health risk behaviours and medical sequelae of childhood sexual abuse. *Mayo Clin Proc* 1992; 67:527.
 39. Rosen J, Fields R. The long-term effects of extraordinary trauma: a look beyond PTSD. *J Anxiety Disord* 1998; 2:179-81.
 40. Rauch S L, van der kolk B A, Fisler R E, Alpert N M, Orr S P, Savage C R, et al. A symptom provocation study of posttraumatic stress disorder using positron emission tomography and script-driven imagery. *Arch Gen Psychiatry* 1996; 53:380-7.
 41. Ironson G, Wynings C, Schneiderman N, Baum A, Rodriguez M, Greenwood D, et al. Post traumatic stress symptoms, intrusive thoughts, loss and immune function after Hurricane Andrew. *Psychosom Med* 1997; 59:128-41.
 42. Hoehn-Saric R, MacLeod D R. The peripheral sympathetic nervous system. *Psychiatr Clin North Am* 1988; 11:375-86.
 43. Kiedolk-Glaser J K, Cacioppo J T, Glaser R. Acute psychological stressors and short-term immune changes: what, why, for whom, and to what extent? *Psychosom Med* 1992; 54:680-5.
 44. Taylor G J, Parker J D A, Bagby M A, Acklin M W. Alexithymia and somatic complaints in psychiatric patients. *J Psychosom Res* 1992; 36:417-24.
 45. Christianson S A. Emotional stress and eyewitness memory: A critical review. *Psychol Bull* 1992; 12:284-309.
 46. Krystal H. Trauma and affects. *Psychoanal Study Child* 1978; 33: 81-116.
 47. Zeitlin S B, McNally R J, Cassiday K L. Alexithymia in victims of sexual assault: An aspect of repeated traumatization? *Am J Psychiatry* 1993; 150:661-3.
 48. Zlotnick C, Zakriski A L, Shea M T, Costello E, Begin A, Pearlstein T, et al. The long-term sequelae of sexual abuse: Support for a complex posttraumatic stress disorder. *J Trauma Stress* 1996; 9:195-205.
 49. Pennebaker J W. *Emotion, Disclosure and Health*. Washington, DC: American Psychological Association, 1995.
 50. Pennebaker J W, Bargar S D, Tiebout J. Disclosure of traumas and health among Holocaust survivors. *Psychosom Med* 1989; 51:577-89.
 51. Joseph S, Dalgleish T, William R, Yule W, Thrasher S, Hodgkinson P. Attitudes towards emotional expression and post-traumatic stress in survivors of the Herald of Free Enterprise disaster. *Br J Clin Psychol* 1997; 36:133-8.
 52. Raphael B, Meldrum L, McFarlane A C. Does debriefing after psychological trauma work. *BMJ* 1995; 310:1479-81.
 53. Tseng W S. The nature of somatic complaints among psychiatric patients: the Chinese case. *Compr Psychiatry* 1975; 16: 236-45.
 54. Pennebaker J W. Traumatic experience and psychosomatic disease: Exploring the roles of behavioral inhibition, obsession and confiding. *Can Psychol* 1985; 26:82-95.
 55. Cheung P. Somatization as a presentation in depression and post-traumatic stress disorder among Cambodian refugees. *Aust N Z J Psychiatry* 1993:422-28.
 56. Katon W, Ries R K, Kleinman A A. A prospective DSM III study of 100 consecutive somatization patients. *Compr Psychiatry* 1984; 25:305-14.
 57. Alpert E J, Sege R D, Bradshaw Y S. Interpersonal violence and the education of physicians. *Acad Med Suppl* 1997; 72:S41-50.