

Psychological Aspects of Disaster

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Human beings have always experienced disasters. A disaster may be brief, but its psychological effects may last for many years. These psychological effects are increasingly well documented.

Disasters affect not only those immediately involved, but also those who know the victims. This is perhaps particularly so when the victims are children. Commonly when adults hear news of disasters they ask first: What about the children? Of course, typically it is worse for the parents.

In this article the definition and classification of disaster and the effects of disaster on survivors and their relatives will be discussed.

Keywords:

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Researchers have often avoided explicit and systematic attention to the question of defining disaster (1). It has commonly been accepted that "a disaster is perhaps easier to recognize than it is to define" (2). However, an implicit conception of the phenomenon is essential for research and policy-making. Many attempts have been made to define or conceptualize the term disaster, the intention being to summarize what social and behavioral scientists presuppose and mean when they use the term disaster.

Quarantelli distinguished seven usages of the term. The first three concern disasters understood as physical events, such as earthquakes, fires, floods and explosions. Increasing emphasis is placed on the physical effects of these events and their magnitude (3).

This increasing emphasis captures the fact that only those earthquakes, for example, with major physical effects would be likely to be called disasters. The remaining categories identified by Quarantelli may be summarized as follows:

Disaster as a social disruption resulting from an event with physical impacts. In this approach, a physical impact is a disaster if the magnitude of the impact, as indicated by property damage and casualties, is believed to be high enough to result in disruption of social life.

Disaster as a social construction of reality in perceived crisis situations which may or may not involve physical impacts. In this conception of disaster, there must also be a socially constructed perception of a crisis situation, that is, a situation that necessitates priority values.

According to this view, actual physical impact is not the crucial element.

Disaster as a political definition of certain crisis situations. Disasters are not only social constructions but also political phenomena (4-6). Thus, whether crisis situations are defined as disasters depend upon political decisions in the broad sense of the term. Such political decisions reflect the interest of the society or power holders in a society or community.

Disaster as an imbalance in the demand capability ratio in a crisis situation. Disaster typically requires no routine and emergent collective behavior. High priority values are threatened and there is a perceived urgent need to act. However the available capabilities are not enough to meet the demands of the disaster (3).

While the definition of a "disaster" varies with the source, there is general agreement in opinions that a disaster is an event that has the following properties; it involves the destruction of property, injury, and/or loss of life; it has an identifiable beginning and end; adversely affects a relatively large group of people; is "public" and shared by members of more than one family; is out of the range of ordinary experience; and, psychologically, is traumatic enough to induce distress in almost anyone, regardless of pre-morbid function or earlier experiences (7).

Barton, defined disaster as a collective stress experience in which large numbers of people fail to have their usual needs met by the social system (8).

Effects on Survivors

Acute and chronic psychological stress reactions of survivors of disasters, especially Posttraumatic Stress

Disorder (PTSD) are well documented for adults, children and adolescents (9-13).

This section and the following one focus on the primary and secondary victims of a disaster: the survivors and their relatives.

Child victims of disaster may be persons directly exposed to the trauma, or indirectly exposed by observation of family members, classmates, or neighbors suffering the direct assault. Increased media coverage of major disasters raises the possibility of children even more removed from the situation being upset by a trauma. The degree of exposure and the extent of loss may be key factors in the psychological impact of a disaster on a child and his/her family (7).

The so called disaster syndrome occurs either during the impact or immediately afterwards. The person typically appears dazed, stunned, apathetic, and passive. He or she may sit or stand immobile or may wander aimlessly, seemingly unaware of surroundings and the presence and needs of others. A number of other maladaptive behaviors have been reported in conjunction with some disasters. These behaviors may be classified as panic. They include acute confusional states or even reactive psychoses, dissociative states, fruitless activity, hysterical reactions, and behavior that is out of touch with reality (14).

Other psychophysiological reactions noted include headaches, breathing difficulties, tremors, palpitations, sweating, malaise, dizziness, and exhaustion (14).

Psychosomatic or psychophysiological reactions in the post disaster period, which have been commonly described in adults, also seem frequent in children. Children's reactions reflect many of the features and patterns found in adults but are often more direct and less disguised (14).

Children who are abused, lose loved ones to accidents, survive individual house fires, and/or personally witness a murder are prime candidates for post traumatic stress disorder (PTSD) (7).

Recently a growing recognition of the existence of Post-traumatic stress disorder in children has emerged (13, 15-19). There is a growing literature on the subject of Post-traumatic stress disorder in children. The literature consistently points to children's vulnerability to the development of Post-traumatic stress disorder after severe trauma. In a review by Yule and Williams it is concluded that when children suffer an extreme trauma, they do indeed react similarly to adults, and show problems very similar to adult PTSD (20).

In a study Mirzamani investigated the PTSD symptoms of adolescents had been directly involved in a disaster in Tehran. Participants were 19 adolescents had survived a boat sinking in Tehran's city park in 2002. The assessment measures used were the Post-traumatic Stress Disorder Symptom Scale (PSS) and clinical interview based on DSM-IV. Sixteen participants (84.2%) were diagnosed with PTSD using PSS and seventeen (89.5%) were diagnosed with PTSD by psychiatric interview (17).

Yule evaluated 334 children who survived the sinking

of the cruise ship, Jupiter. These children were compared with a control group matched for sex and age. Survivors reported more fears, particularly of stimuli related to the trauma than the controls. Overall, their scores on the Impact of Events Scale were as high as those reported by adults in other disasters. Follow-up studies a year after the accident have demonstrated that nearly half the children of this study meet the DSM-III-R criteria for PTSD (21).

Martini, Ryan, Nakayama et al. used the revised version of the PTSD Reaction Index to evaluate five children who were injured when a speedboat crashed into spectators watching the Pittsburgh Regatta. The researchers also used this instrument to interview the parents about their traumatized children. Three of the children met DSM-III-R criteria for PTSD as confirmed by either self-report or parental report (22).

Definition of Post - Traumatic Stress Disorder

Within the diagnostic literature, Post Traumatic Stress Disorder (PTSD) has been defined by: a) the experience of a traumatic event; b) persistent re experiencing of the traumatic event; c) persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness; d) persistent symptoms of increased arousal; e) more than one month duration of the disturbance; f) significant distress or impairment in social, occupational, or other impairment areas of functioning (23).

In DSM IV the essential feature of Post Traumatic Stress Disorder includes the development of characteristic symptoms following exposure to an extreme traumatic stressor involving direct personal experience of an event that involves actual or serious injury, threat to one's physical integrity, witnessing an event that involves death or injury, a threat to the physical integrity of another person, or learning about unexpected or violent death or serious harm, threat of death or injury experienced by a family member or other close associate, or learning that one's child has a life threatening disease (23).

Yule and Gold write (18).

"Post Traumatic Stress Disorder is defined by World Health Organization and the American Psychiatric Association as a reaction that may follow an event that is outside the range of usual human experience and would be very distressing to almost anyone. There are three main groups of symptoms or reactions:

1) The traumatic event is persistently re experienced in thoughts, dreams or flashbacks where the individual thinks it is all happening again.

2) There is persistent avoidance of stimuli associated with the trauma, or there is numbing of general responsiveness.

4) There are signs of increased physiological arousal.

These reactions can be seen in people of all ages.

Post-traumatic stress disorder currently refers to a person who has reacted with intense fear, helplessness, or horror to a major (or minor) trauma by developing;

1) intrusive thoughts and the re-experiencing symptoms; 2) avoidance responses to evidence of the trauma and generalized psychological numbing and isolation; and 3) widespread physiologic arousal (24).

Classification

There are two well-known classification systems used in the psychiatric assessment of survivors of trauma. The first, the International Classification of Diseases prepared by the World Health Organization (WHO), is currently in its tenth edition, (ICD-10). Whilst the ICD-10 is accepted in the United States as a general standard, the American Psychiatric Association's (APA) Diagnostic and Statistical Manual of Mental Disorders is widely used. This is currently in its fourth edition (DSM-IV). Recognition of the psychological effects of trauma within ICD and DSM classification systems is relatively recent. The classification of Post-traumatic stress disorder in each system will be discussed in the next two sections.

The Classification of ICD-10

The Classification of Mental and Behavioral Disorders (ICD-10, 1992) classified Post-traumatic Stress Disorder under reaction to severe stress, and adjustment disorders. Major difference between the APA and ICD-10 is that, ICD-10 considers symptoms of emotional numbing as not necessary for diagnosis of disorder, but rather, as a frequent accompaniment to disorder.

The Classification of Diagnostic and Statistical Manual of Mental Disorders

The original Diagnostic and Statistical Manual (DSM-I; 1952) contained the diagnosis "gross stress reaction". Although being characterized by an individual's exposure to extreme emotional and physical stress, it was thought to diminish rather rapidly unless maintained by pre-morbid personality traits. DSM-II deleted the category of "gross stress reaction", mentioning trauma related stress only in the context of "adult adjustment reactions" (25). It was in the DSM-III that the term of Post-traumatic Stress Disorder first appeared (26).

The classification of Post-traumatic Stress Disorder (PTSD) in DSM-III and DSM-III-R represents a curious hybrid (26). These manuals were avowedly written on the basis of a symptomatic classification of mental disorders, because of the opinion that insufficient information was available regarding their etiology or even pathogenesis. Post-traumatic stress disorder is currently classified among the anxiety disorders presumably because it is accompanied by the concomitants of anxiety (e.g., insomnia, exaggerated startle response, and difficulty concentrating) (27).

Although DSM-III-R (1987) continued the approach initiated with DSM-III (1980) several important modifications were made to the stressor criteria (28). First, in an effort to refine the phenomenological criteria to better reflect anxiety-related symptoms, DSM-III-R notes that stressors in Post-traumatic stress

disorder are "usually experienced with intense fear, terror, and helplessness". Second, in addition to direct experience of the stressor, DSM-III-R includes visual (witnessing an event) and verbal (hearing about an event) mediation. Finally, DSM-III-R provides an example of qualifying events within the criteria set, as well as no qualifying events within the accompanying text, separating these events along quantitative and qualitative dimensions. Thus DSM-III-R also acknowledges (without operationalizing) the importance of subjective perception whilst continuing to frame Post-traumatic stress disorder as a stressor driven anxiety disorder (29).

In anticipation of DSM-IV, arguments have been presented for reformulating the stressor criterion either by abolishing them altogether or defining them as an event shocking the individual (30). Advocates of the latter suggest that the stressor criterion be reformulated in terms of generic features common to the environmental event shaping Post-traumatic stress disorder phenomenology.

The Symptoms of Post-Traumatic Stress Disorder

An understanding of the diagnostic criteria for Post-traumatic stress disorder is crucial for a thorough assessment of the disorder. To this effect a substantial proportion of the literature is concerned directly or indirectly with the symptomatic picture of patients with Post-traumatic stress disorder. In order to be diagnosed as having Post-traumatic stress disorder, the individual must have experienced an event outside the range of typical human experience, and this experience must be one which would be considered distressing to almost anyone (7).

By now a wide range of emotional responses to disasters has been described in several studies. General fears, anxieties, and tensions are frequently mentioned as common emotional responses to a disaster (31-36). Such emotional responses have been reported across a range of disaster types, including tornadoes (37), earthquakes (38), nuclear plant accidents (39), hailstorms (40), cyclones (41), hurricanes (31), train accidents (42) and floods (43).

Situational and deeper depression is reported as other relatively common emotional responses to impact and loss (44). Severe or prolonged disasters appear to be linked to the more severe depressive reactions (40, 45, 46).

Also, in several studies grief reactions have been reported amongst disaster survivors (47, 48). They are often associated with the deaths of primary group members (49), but may occur in response to the loss of home and property (33). Guilt is a particularly prevalent emotional response in disasters that claim a large number of lives (42, 50, 51). Disasters with high death tolls may also leave survivors with a "death imprint" (51); this is described by Erickson as remembrances of the disaster associated with "death, dying and massive destruction (52)".

Classic symptom patterns in Post-traumatic stress disorder consist of intrusive thoughts about the traumatic experience and psychological efforts to avoid reminders or cues related to the trauma. Intrusive thoughts may be observed in the waking state in the form of "flashbacks," or intensively vivid reenactment experiences in which the original traumatic fear and psychological distress is also reactivated. In addition, intrusion patterns may occur during the sleeping state in the form of thematically related nightmares. Avoidance patterns may be observed when trauma victims show discomfort followed by shifting attention away from reminders of their traumatic experiences. Successful efforts to avoid painful reminders by eliminating risk of exposure to them may be learned through negative reinforcement. These patterns of intrusion and avoidance are commonly seen in the natural temporary experience of acute grief following the death of a loved one. However, in the case of Post-traumatic stress disorder the process by which grief and other overwhelming emotions are eventually resolved through natural coping seems to have been arrested (53).

Finch and Daugherty, discussed having lived through the disaster, the individual must exhibit one of the following symptoms, which are related to reliving the trauma; 1) intrusive thoughts and recurrent distressing memories of the event, which may be manifested in children as repetitive play enacting the themes of the trauma; 2) recurrent dreams about the event which are distressing; 3) sudden feeling or action as if the trauma was occurring again; and 4) intense distress at exposure to events that represent or resemble aspects of the trauma. These symptoms vary from those which are known only to the individual to those that may be obvious to those around the person (distress at exposure) (54).

Yule and Gold (1993) discussed reactions that can be seen in individuals of all ages but they concentrate on children and adolescents: 1) Re-experiencing the trauma: people may have vivid visual thoughts about the trauma that intrude at any time during the day. Such intrusions thoughts can be very distressing. In children and adolescents, re-experiencing the trauma may appear, as intrusive thoughts of which, most, are repetitive thoughts about the disaster. 2) Avoiding thinking about the experience: people try to avoid thinking about the trauma or avoid dealing with the emotions. Adolescents in particular seem to find it hard to think about the future. In children there is not so much evidence of difficulty in sustaining emotional relationships or in having loving feelings. However children often show a lack of interest in hobbies they previously enjoyed and many do not want to talk about their feelings with their parents, although at some point, survivors feel a great need to talk over their experiences with peers. Children and adolescent survivors often feel guilty that they are alive when others have died. Also, they often feel guilty that they might have done more to help others during the

accident. 3) Heightened anxiety and arousal: survivors have major difficulties in getting off to sleep and may wake frequently during the night. They have difficulties with concentration, memory and new learning. In children and adolescents, heightened anxiety and arousal may be shown as: lack of concentration, sleep disturbance, separation difficulties, memory problems, heightened alertness to dangers, fear, irritability, depression, bereavement reactions, anxiety and panic (18).

The DSM-II criteria for Post-traumatic stress disorder includes: firstly, the re-experiencing of the event through intrusive memories, nightmares, and flashbacks; Secondly, inhibitory processes such as the numbing of affect. Interpersonal isolation and withdrawal; thirdly, memory impairment, and difficulty concentrating; and fourthly, hyper alertness or exaggerated startle response. Additionally, the DSM-III criteria indicate that patients with Post-traumatic stress disorder are psychophysiological hyper aroused, and that they show an intensification of symptoms following exposure to events associated with the trauma.

Avoidance of trauma-related cues may come to characterize the lifestyles of survivors who are unable to overcome their immediate trauma crisis reactions. Feared stimuli eliciting escape or avoidance responses may not be limited to the physical environment. Strong negative emotions, such as rage, grief, and intense anxiety or panic, may elicit patterns of responding very similar to the individual's original trauma reactions (or-enactment); they may thereby establish escape or avoidant behaviors in a much wider range of situations (53).

There is some evidence that avoidance of painful material is a central mechanism in Post-traumatic stress disorder. For example, Malloy, Fairbank, and Keane, found that the best predictor of the diagnosis of post-traumatic stress disorder in Vietnam veterans was the strong tendency of veterans with Post-traumatic stress disorder to terminate the viewing of simulated reenactments of combat material. Thus, while the essential features of Post-traumatic stress disorder remain the same in the DSM-III and DSM-III-R, there are several important differences. The most important change is an increased emphasis on avoidance in the DSM-III-R. This cluster of symptoms has been associated with the numbing of general responsiveness symptoms. The criteria for avoidance are listed under section C (55). They include:

- 1) Efforts to avoid thoughts or feeling associated with trauma.
 - 2) Effects to avoid activities or situations that arouse recollections of the trauma.
 - 3) Inability to recall an important aspect of the trauma.
- The set of symptoms that is the most difficult to properly assess is the cluster of behaviors associated with avoidance. In Post-traumatic stress disorder, there must be at least three of the following avoidance symptoms; 1) attempts to avoid thoughts or feelings

about the trauma; 2) attempts to avoid activities or situations that result in recollections of the trauma; 3) an inability to recall important aspects of the trauma; 4) a decreased interest in activities or in children, the loss of recently acquired developmental skills; 5) a feeling disconnected from others; 6) a restricted range of affect; and 7) a sense of a foreshortened future. These avoidance symptoms would make it very difficult for the person to respond positively when asked about the trauma. For example, a child might deny having symptoms associated with the trauma as a way of avoiding thinking about it. It could be argued that this type of avoidance makes the accurate assessment of Post-traumatic stress disorder in children impossible (54).

The final set of symptoms associated with Post-traumatic stress disorder refers to increased arousal. Two of the following symptoms must be present; 1) difficulty sleeping; 2) irritability or outbursts of anger; 3) problems in concentrating; 4) hypervigilance; 5) an exaggerated startle response; and 6) physiological reaction to exposure to events associated with or symbolizing an aspect of the trauma. Again, these symptoms may not be obvious to those around the person, and in addition, some of the symptoms are frequently associated with other disorders (e.g., irritability is associated with depression) (54). Of course as formulated in DSM-III-R, Post-traumatic stress disorder must be present for at least 1 month for the diagnosis to be made.

Of course symptom patterns in Post-traumatic stress disorder include physiological, cognitive and behavioral manifestations. Autonomic arousal upon presentation of trauma-related cues is consistently found among approximately two-thirds of PTSD-positive combat veterans (56). Although other trauma populations have not yet been assessed for physiological reactivity in laboratory analogue situations, hypervigilance, exaggerated startle responses, and panic symptoms are frequently reported by these survivors. Thus, it seems reasonable to expect that physiological arousal to traumatic cues may represent an important feature in these cases as well (53).

To diagnose post-traumatic stress disorder, DSM-III, and particularly DSM-III-R, demanded that there be a severe stressor "outside the range of usual human experience". DSM-IV has shifted from a primary emphasis on the severity of the stressor to a mixture of exposure to a traumatic stressor coupled with a patient's reaction to it (24).

Cognitive distortions indicative of "shattered" life assumptions are also frequently observed (57). Critical assumptions about personal invulnerability, equitability and fairness of life, and personal self-worth may shift radically after traumatic victimization. Extreme self-blame, inability to trust others, and a constant fear for personal safety may develop to the extent that survivors are rarely free of the need to monitor their interpersonal and physical environments

constantly for signs of danger (53).

PTSD in Children and its Effects on their Parent

The relationship between children's symptoms and parental symptoms has received some attention (58), and, a few studies directly assessed the effects of PTSD in children on their parents. 37 mothers of survivors participated in a study were recruited in the course of a follow-up study of survivors, the methodology and results of which have been published elsewhere (59-62). Women whose children had been involved in the disaster were found to have suffered a greater number of incidents of psychological distress in the period since the disaster than the women who had suffered no major negative life event but fewer incidents of psychological distress than the widows (60). Also, women whose children were involved in the disaster presented PTSD symptoms. This effect was greater in the subgroup whose children had developed traumatic stress disorder following the disaster (61).

The roof blew off a Swindon Primary School, in 1991. One child died. There were 29 other children in this class in which a child was killed. Parker, Watts and Allsopp investigated PTSD symptoms in 19 of the classmates both at post-event and at 2 years follow-up. They also investigated whether parents recall PTSD symptoms of their own and whether parental factors (e.g. symptoms of PTSD or overall psychiatric morbidity as measured by the GHQ) are associated with the development or resolve of symptoms in their children. In their study they asked each parent to complete the "Impact of Events Questionnaire" (IOE) for their feelings shortly after the event. They were also asked to complete the 28 item scaled version of the General Health Questionnaire (GHQ). The parents' GHQ scores were similar to a random sample of GP attenders. Thus, no correlations were found between the parents' score (either on GHQ or recalled IOE) and their own children's score. Two years after the disaster parents' general mental health as measured by the GHQ seems unaffected. They concluded that, their study gathered information about post-traumatic reactions of parents and children following a disaster, which only affected the children directly. Of course, firm conclusion seems hard to draw from this study, because sample size is small ($n = 19$) and a relatively low take up rate of 67% (19 from 29) (58).

However, while the incidence features, and course of PTSD have received considerable research attention, there have been few controlled investigations of the effects on the family system, such as the effects on parents of a child being involved in a disaster. In a study of Cambodian high school students who survived four years under the Pol Pot regime (1975-1979) compared with Cambodian students who escaped their homeland prior to Pol Pot, family members were also assessed (63). Many of the family members exhibited post-traumatic stress and affective symptoms. More than three-quarters of all the parents had lived in

Cambodia under Pol Pot's rule. Parents were inquired regarding the level of stress they were experiencing. The results indicated that more than half of the respondents had the following symptoms: trouble sleeping, trouble concentrating, anxiety, fatigue, irritability, and sadness or depression.

Measurement of PTSD (Psychometric and Psychodiagnostic Testing of PTSD)

Since 1980, when Post-traumatic stress disorder (PTSD) was officially recognized as a unique diagnostic entity and included in the Diagnostic and Statistical Manual III (26), a large body of research has been done in the assessment of this disorder. Now, to further diagnostic certainty, patients suspected of manifesting Post-traumatic stress disorder may be administered various psychological assessments, including structured clinical interviews, questionnaires, and psychophysiological procedures (64-66). Traditional batteries of tests can provide information overlooked or missed during the structured interview and mental status examination. Of course, use of multiple instruments provides converging evidence that increases confidence in diagnostic decision making and treatment planning (67).

This section will explain three methods of collecting diagnostic information: A) Clinical interview, B) Questionnaires or inventories, and C) Psychophysiological techniques.

Clinical Interview

The foundation of the Post-traumatic stress disorder assessment is the clinical interview. Interview could be relatively unstructured or could be highly structured, with standardized questions that inquire about specific diagnostic criteria. For diagnostic decision making in clinical research on Post-traumatic stress disorder it has become standard practice to use structured interviews. Also, the use of structured diagnostic interviews to assess current and lifetime diagnoses of comorbid psychiatric disorders is recommended. Structured interviews allow investigators to specify accurately how diagnoses were made and whether the diagnoses are reliable and valid. They can also be valuable in clinical work in that they allow the clinician to inquire systematically about specific Post-traumatic stress disorder symptoms and comorbid syndrome (68). In the following section, there are some structured interviews that can be valuable in the assessment of trauma victims.

Clinical Administered Post-traumatic stress disorder Scale: the Clinical Administered Post-traumatic stress disorder Scale (CAPS) is a structured interview for Post-traumatic stress disorder that was designed for use by clinicians (69). This interview is developed at the National Centre for Post-traumatic stress disorder. The CAPS yields dichotomous and continuous scores. The CAPS consists of thirty items that assess DSM-III-R symptoms of Post-traumatic stress disorder, symptoms

associated with Post-traumatic stress disorder (e.g., survivor guilt), and overall symptom severity, degree of improvement and impairments in social functioning. Two versions of the CAPS are available: CAPS-1 and CAPS-2; CAPS-1 is a current and lifetime diagnostic version, CAPS-2 is a weekly symptom-rating version. The Structured Clinical Interview of Diagnostic and Statistical Manual of Mental Disorder-III-Revised (DSM-III-R) (SCID): The SCID is a structured diagnostic interview used to assess Axis I and II disorder in the DSM-III-R. It consists of separate modules for each diagnostic category. The PTSD module of the SCID consists of probe questions for each of the seventeen PTSD symptoms in DSM-III-R, plus sensitive and clear questions on survivor guilt and guilt over acts of omission or commission. The PTSD module of SCID appears to be clinically sensitive and reliable and has been widely used in PTSD research (68). In a study by Solomon, Benbenishty, Neria, Abramowitz et al. examined psychometric properties of the revised post-traumatic stress disorder (PTSD) Inventory and the extent of agreement between it and the Structured Clinical Interview (SCID) and the Impact of Events Scale (IES). In this study the sample included 147 soldiers from the 1973 Yom Kippur War who were treated for combat stress reaction. They were either former prisoners of war (POWs), or were matched with POWs on personal and military background. They found 84% agreement between the PTSD Inventory and SCID in the past and 85% in the present, indicating a high convergent validity (70).

However, a significant limitation of the SCID is that it can yield only dichotomous present/absent information about PTSD (68).

Post-traumatic stress disorder interview: the Post-traumatic stress disorder interview (PTSD-I) yields both a dichotomous and a continuous score (68, 71). Watson et al. reported strong test-retest reliability (.95) and internal consistency (71).

Structured interview for Post-traumatic stress disorder (SI-PTSD): the Structured Interview for Post-traumatic stress disorder (SI-PTSD) is a useful structured clinical interview for Post-traumatic stress disorder assessment (68, 72).

The Diagnostic Interview Schedule: the Diagnostic Interview Schedule (DIS) is a highly structured interview designed for use by nonclinicians and has much less recommended.

Questionnaires and Inventories

The assessment of trauma victims can be enhanced greatly through the use of standardized instruments and methods such as questionnaires. There are several questionnaires in this field that have been developed and psychometrically evaluated: such as Minnesota Multiphasic Personality Inventory (MMPI), Symptom Check List-90 (SCL-90) and MMPI-2 (73, 74). These type of measures of Post-traumatic stress disorder are easy to administer and score, and they are useful to screen for the presence of Post-traumatic stress

disorder. In this section, related literature will be reviewed and some questionnaires explained.

Impact of Event Scale (IES): the Impact of Event Scale (IES) is a fifteen-item questionnaire measuring intrusion (7 items) and avoidance (8 items) in a traumatized person. It yields an overall score, and two subscale scores (75): A) intrusive thoughts, images, ideas, and feeling, and B) avoidance of reminders and situations associated with the event. The Impact of Events Scale (IES) is the most widely used instrument for assessment of Post-traumatic stress disorder, particularly in the UK (68). The Impact of Event Scale is a self-report measure that can be anchored to any specific life events and taps: 1) intrusively experienced ideas, images, feelings and dreams, and 2) the avoidance of ideas, feelings, or situations. Horowitz et al., found that the intrusion and avoidance subscales had good internal consistency (.78 for intrusion, .82 for avoidance) and test-retest reliability (.89 for intrusion, .79 for avoidance) (75). They found a moderate correlation (.42) between the intrusion and avoidance subscales. A strong relationship between a DSM-III PTSD inventory and the IES has been demonstrated with Israeli combat veterans (76).

Two studies (77, 78) reported intrusion and avoidance factors with bereaved outpatients and Israeli soldiers respectively.

Minnesota Multiphasic Personality Inventory: More diagnostically reliable data can be collected from the Minnesota Multiphasic Personality Inventory (MMPI). A post-traumatic stress disorder patient often manifests a characteristic pattern. Much research has been directed towards developing a Post-traumatic stress disorder sub-scale of the Minnesota Multiphasic Personality Inventory (MMPI) (79-81). Studies which have employed the MMPI to assess the adjustment of patients with Post-traumatic stress disorder have consistently shown elevated scores on a number of clinical scales (81 & 83). In Keane, Malloy, and Fairbank's study, they tried to develop empirically based criteria for the use of the MMPI in order to aid assessment and diagnosis of combat-related post-traumatic stress disorder. In this study 200 male Vietnam combat veterans who were assigned to a post-traumatic stress disorder group (n=100) or a non-PTSD group (n=100) were administered the MMPI. Standard clinical profiles demonstrated that Post-traumatic stress disorder group had overall higher mean elevations, and discriminate function analysis correctly classified 74% of subjects in each group. A special Post-traumatic stress disorder subscale was developed and cross-validated that improved diagnostic hit rates to 82% of subjects. In this study, a consistent MMPI-8-2 pattern was noted in the Post-traumatic stress disorder group. The F scale was also consistently, and significantly, elevated. In addition, significantly higher scores were noted on all clinical scales except *Mf*, and a significantly lower score on *K*. The decision rule developed included cutoff scores at: $F=66T$, $Sc(8)=76T$ $D(2)=78T$. Subjects with all three scores above the

cutoff levels were classified as having Post-traumatic stress disorder. This decision rule led to the correct identification of 74% of the patients with Post-traumatic stress disorder (80). Also, in a study by Foy et al, 43 Vietnam veterans seeking psychological services at a Vietnam veteran's medical centre, were assigned to positive and negative groups of post-traumatic stress disorder based on the DSM-III. Groups were compared on profiles from the MMPI and a psychological problem checklist. Results of this study showed that the Minnesota Multiphasic Personality Inventory (MMPI) had moderate ability to correctly classify subjects on the basis of Post-traumatic stress disorder diagnosis (82).

Post-traumatic stress disorder subscale of the MMPI: Keane, Malloy, and Fairbanks also developed a special subscale for combat-related Post-traumatic stress disorder (80). The hit rate of this scale was over 80%. They note that items included on the scale tended to relate directly to the major Post-traumatic stress disorder criteria in the DSM-III-R. In sum, Keane, Malloy, and Fairbank note that the MMPI could reliably discriminate the Post-traumatic stress disorder group from veterans with affective disorders, anxiety disorders, personality disorders, and psychotic disorders (80). Hyer, O'Leary, Saucer, Blount, and Boudewyns, found that inpatient veterans with Post-traumatic stress disorder also had elevated 8-2 (*Sc-D*) patterns on their MMPI. They also indicated that the MMPI-PTSD subscale could accurately differentiate veterans with Post-traumatic stress disorder from other inpatient combat and non-combat veterans without Post-traumatic stress disorder. However, the hit rate was somewhat lower at 69% (83).

Since the original work of Keane et al (80). Much research has developed to evaluate the validity, and examine the profiles of the Post-traumatic stress disorder sub-scale of the MMPI (67, 83-93). Fairbank et al. indicated that the MMPI could adequately discriminate Vietnam combat veterans with Post-traumatic stress disorder from two other control groups of veterans (79).

Using a short form (71-item) of the Persian form of the MMPI, Mirzamani examined applicability of the *F* and *K* scales of MMPI in a group of war Post-traumatic stress disorder patients (87). The sample of this study was composed of four groups: A) 32 out-patient soldiers with Post-traumatic stress disorder. B) 32 soldiers without any psychiatric visit at all. C) 32 non-military neurotic matched person. D) Control group including 32 non-military person without any psychiatric visit at all. Significant differences were found between sub groupings. The groups of Post-traumatic stress disorder patients were significantly high in the *F* scale and the standard clinical profiles demonstrated that the Post-traumatic stress disorder group (A) had overall higher mean elevations in most of the clinical scales, and a significantly low mean in *L* scale. Findings of this study indicated Post-traumatic

stress disorder soldiers showed over reporting of their problems (87).

The main criticism is that the MMPI was designed long before PTSD was defined by the APA, and new items were included. Also most of these studies are however, with combat veterans rather than victims of civilian trauma.

MMPI-2: The MMPI-2 has also been shown to be useful in the assessment of Post-traumatic stress disorder (73, 94, 95). MMPI-2 has been used in several studies, for example, Litz et al. (1991) administered both the original Minnesota Multiphasic Personality Inventory (MMPI) and Minnesota Multiphasic Personality Inventory (MMPI-2) to a sample including 29 persons with post-traumatic stress disorder, 37 mixed veteran psychiatric inpatients, 64 mixed veteran inpatient substance abusers, and 32 nonveteran normals. Findings show highly significant correlations between MMPI and MMPI-2 basic scales for the PTSD sample. The MMPI-2 effectively identified PTSD subjects from the other groups. Results also showed a high degree of association between the MMPI and MMPI-2 in regard to PK scores, although minor differences were found in PK raw scores between the 2 tests (95).

Ward, in a study regarding MMPI-2 assessment of positive attributes, concluded that, the T-score table for the MMPI-2 provides no values lower than 30. Use of these tables with measures of positive psychological attributes in clinical samples can produce T-score distributions that are markedly truncated at the low end. Data were from 39 men with post-traumatic stress disorder and 127 men entering a program for addiction. Data were presented to show that the statistical characteristics of several MMPI-2 scales are affected (96). Albrecht et al, replicated a study by Litz et al. on the comparability of the MMPI and the MMPI-2 in post-traumatic stress disorder assessment. 47 male Vietnam veterans with combat-related post-traumatic stress disorders were administered the MMPI and MMPI-2 (95, 97). Pairwise comparisons were performed on the clinical scales, Harris Lingoes subscales, and scales relevant to the assessment of PTSD. Although results showed a high degree of congruence between tests, differences in the tests' evaluations of the post-traumatic stress disorder and F scales may influence interpretation and treatment (97). Mississippi Scale for Combat-Related Post-traumatic stress disorder (Mississippi Scale): the Mississippi Scale is a 35-item scale designed to measure combat-related Post-traumatic stress disorder (98). The items of this scale were selected from an initial pool of 200 items that reflected DSM-III criteria, and additional items were included to assess substance abuse, depression, and suicidality. Keane, Caddel and Taylor, reported excellent internal consistency (.94) and test-retest reliability (.97 over a one-week interval) (98).

The Symptom Check List-90 (SCL-90): the SCL-90 is a ninety-item self-report inventory that measures current levels of psychopathology on nine symptoms

dimensions: Somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism (74). In a preliminary study the SCL-90 has been shown to assist in the assessment of Post-traumatic stress disorder (Saunders, Mandoki, Kilpatrick, 1990). A twenty-eight-item Post-traumatic stress disorder scale from the SCL-90 was derived and reported to have adequate sensitivity (.75) and specificity (.90).

The Post-traumatic stress disorder Symptom Scale, Self-Report version (PSS-SR) contains 17 items that diagnose Post-traumatic Stress Disorder according to the Diagnostic and Statistical Manual of Mental Disorders III Revised (and DSM-IV) criteria. These items also assess the severity of Post-traumatic Stress Disorder symptoms (99). Foa, et al., (1993) examined the psychometric properties of the two versions of the Post-traumatic stress disorder Symptom Scale: 1) an interview version of the Post-traumatic stress disorder Symptom Scale, and 2) a self-report version. These two versions of the Post-traumatic stress disorder Symptom Scale were administered to a sample of 118 recent rape and non-sexual assault victims. The results showed that both versions of the Post-traumatic stress disorder Symptom Scale have satisfactory internal consistency, good concurrent validity, and high test-retest reliability (99). PSS has been translated to Persian language by first author who is graduated from Institute of Psychiatry, London, and speaks English as a second language and Persian as first language. And then compared Persian form to the original form by one of his colleague. After that translated back to English form by the other colleague. Two forms were compared and satisfied both of them. The final form was given to 5 schoolgirls to be completed.

In a research by Stieglitz, Frommberger, Foa and Berger the psychometric properties of the PTSD Symptom Scale (PSS) were evaluated in a clinical sample of severely injured in-patients after a traffic accident (n = 123). The results indicate that the PSS has satisfactory reliability and validity (internal and external) (100).

The validity of the Impact of Events Scale (IES) and the Posttraumatic Stress Disorder (PTSD) Symptom Scale, Self-Report version (PSS-SR) was examined among crime victims (101). Both instruments performed well as screeners for PTSD. For the IES, sensitivity ranged between .93 and 1.00; for the PSS-SR, sensitivity ranged between .80 and .90. Specificity for the IES ranged between .78 and .84 and for the PSS-SR ranged between .84 and .88. The authors conclude that either of these short self-report instruments or their individual items are suitable as screeners for PTSD, specifically in settings where mental health professionals are unavailable (101).

In a study by Coffey, Dansky, Falsetti, Saladin and Brady (1998) the psychometric properties of a modified version of the PTSD Symptom Scale Self-Report (PSS-SR) were examined in a group of treatment-seeking substance use disorder (SUD)

patients (N = 118). The modified version of the PSS-SR, demonstrated good internal consistency reliability and was correlated with other self-report measures of trauma-related symptomatology. Comparisons between a structured PTSD diagnostic interview and the modified PSS-SR indicated that 89% of the PTSD positive patients were correctly classified by the modified PSS-SR (102).

The applicability of the Post-traumatic Stress Disorder Symptom Scale (PSS) was investigated in a group of adolescents who had been directly involved in a disaster in Tehran. The results indicated that the PSS appears to be an effective and efficient method of screening for PTSD (35).

Psycho physiological Methods

Psycho physiological assessment methods have been used primarily by researchers in combat-related Post-traumatic stress disorder (103). For example, McFall et al, tested the hypothesis that combat veterans with post-traumatic stress disorder will experience sympathetic system activation in response to war-related laboratory stimuli. In this research, the experimental stressors consisted of two 10-min motion pictures depicting noncombat-related and combat-related situations, respectively. Circulating levels of norepinephrine and epinephrine were measured in arterialized forearm venous plasma. Heart rate and Blood pressure were measured using an automated ultrasonic detector. Circulating plasma catecholamines, vital signs, and affect ratings were measured in 10 Vietnam veterans with PTSD and 11 control subjects, during and after viewing combat and noncombat stress films. PTSD subjects responded more strongly than control group to the combat film. They calculated difference from baseline scores for dependent variables and subjected to analyses for each experimental period. In this study PTSD subjects reported significantly greater subjective emotional arousal than did controls on the affect ratings measure (104).

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