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Post-traumatic stress disorder symptomatology in a traumatically injured population

Clark, Susanne Jane, M.S.
The University of Arizona, 1991

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POST-TRAUMATIC STRESS DISORDER
SYMPTOMATOLOGY IN A TRAUMATICALLY
INJURED POPULATION

by
Susanne Jane Clark

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A Thesis Submitted to the Faculty of the
COLLEGE OF NURSING
In Partial Fulfillment of the Requirements
For the Degree of
MASTER OF SCIENCE
In the Graduate College
THE UNIVERSITY OF ARIZONA

1991
STATEMENT BY AUTHOR

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SIGNED: Suzanne Clark

APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:

Leanna Crosby, D.N.Sc  9/20/91
Assistant Professor of Nursing
DEDICATION

To my husband, whose sense of humor and pragmatism were little orange life vests that buoyed me when I was awash in a sea of self-doubt.

To my sister, who is Raggedy Ann to my Andy, Rosencrantz to my Guilderstern, Abbott to my Costello. Thanks, Pilgrim.

To my parents, whose bountiful inheritance to me was a treasure chest full of gems such as integrity, courage and imagination. I can never thank enough the two who started it all.
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Dr. Woodtli – for replacing gawky structure with polished sophistication.

Dr. Parsons – for splitting the atoms of research thereby unleashing a new entity: understandable nursing exploration.

These nurse researchers showed me the beauty inherent in scientific thought.

I would also like to thank my thesis committee members whose comments and suggestions powered my thesis on its way to a satisfying denouement.

The following persons' contributions were much appreciated:

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ABSTRACT

The purpose of this study was to determine the relationship between non-combat traumatic injury and the occurrence of Post-Traumatic Stress Disorder (PTSD) symptomatology. The animal model of inescapable shock (IS) provided a physiological rationale for the nursing interventions discussed relative to decreasing the negative impact of a traumatic injury. Traumatically injured subjects (n=33) completed the Modified Late Effects of Accidental Injury Questionnaire, Part I (MLEAIQ-I) to assess any late negative effects subsequent to the traumatic injury, Part II (MLEAIQ-II) to measure the incidence of symptomatology associated with PTSD, and the Revised Impact of Event Scale (RIES) to measure PTSD symptomatology as defined by intrusion and avoidance experiences. No statistically significant relationships were found between PTSD symptomatology and subject injury severity, length of hospital stay, or subject reported late negative effects from a traumatic injury. However, the level of PTSD symptomatology among the subjects was moderate to high.
CHAPTER I
INTRODUCTION

"After a certain moment you just keep running the 100 yard dash...It is all or nothing. I am constantly and totally preoccupied with not getting out of control" (Viet Nam veteran as cited by Van der Kolk, Greenberg, Boyd & Krystal, 1985, p. 314).

Post-traumatic stress disorder (PTSD) is a "disorder that occurs following a stressful event that is outside the realm of normal human experience" (American Psychiatric Association, 1987). Three variables have been hypothesized to contribute to the development of PTSD: the victim's pre-existing personality, the nature of the trauma and the environment to which the victim returns (Mejo, 1990). Any person exposed to overwhelming stress is at risk for developing PTSD (Silverman, 1986). Natural disasters and a range of acts of violence, outside of war, have been shown to produce PTSD victims (Sonnenberg, 1988). Although PTSD research has expanded since the Viet Nam war, little of this research has focused on the non-combat traumatically injured victim. The traumatically injured victim is any person who has sustained severe, multiple injuries either in a motor vehicle accident or by a violent physical attack. Traumatic injuries are on the rise across the nation. Accident statistics for 1988 in the United States reflect: a death by motor vehicle accident occurred every eleven minutes...firearm injuries increased by 8% since 1987...the accidental death rate
represented 39.1% of the overall death rate...accidental injuries cost the United States 143.4 billion dollars (Accident Facts 1989 Edition, National Safety Council). With the world becoming an increasingly violent place, the focus of PTSD research needs to become demilitarized and broadened to include those victims enmeshed in violent civilian trauma.

**Purpose**

The purpose of this study was to determine the relationship between non-combat traumatic injury and the occurrence of PTSD symptomatology.

**Theoretical Framework**

In order to understand how a traumatic injury can precipitate PTSD, the animal model of inescapable shock (IS) (Van der Kolk, et al., 1985) was utilized as a theoretical framework. At the core of this model is the premise that the behavioral and physiological consequences, resulting from exposure to IS, result not from the shock itself but rather from the lack of control that the animal has in terminating the shock (Maier & Seligman, 1976). There are no published studies in which this animal model has been adapted to human subjects; however, the behavioral sequelae of IS in animals closely parallels the negative symptomatology of PTSD in humans (Van der Kolk, et al., 1985). The IS model is assumed to be applicable across species as it typifies the neurophysiologic response to stress which occurs in both animals and man.
The locus coeruleus (LC) is the primary source of noradrenergic innervation of the limbic system, cerebral cortex, cerebellum and hypothalamus and thereby exerts hierarchical control over the autonomic nervous system (Figure 1). Brief high frequency stimulation of central noradrenergic pathways rapidly establishes permanent augmentation of monosynaptic evoked responses. Consequently, researchers postulate that potentiation of neural circuits provides a "neurophysiological analog of memory" (Delanoy, Tucci & Gold, 1983). Kalil (1989), in experiments relative to long-term brain synaptic potentiation (LTP), reported that brief, high-frequency stimulation of a postsynaptic cell in the hippocampus resulted in an influx of positively charged ions which lowered the membrane potential below a set threshold. This increasing negativity activates N-methyl D-aspartate (NMDA) which is thought to function as a gate receptor controlling calcium channels. Once NMDA is activated, associated calcium channels open causing a flooding of calcium ions into the cell. Intracellular enzymes, activated by the calcium ions, then effect a reorganization of membrane proteins leading to a subsequent improvement in the efficiency with which the postsynaptic cell responds to specific patterns of stimulation (Kalil, 1989). Pitman (1988) called this process "etching" (p. 187) and postulated that the brain is primed for such etching by the extreme state of arousal brought about by a traumatic situation. Indeed, Gold and van Buskirk (1975) found that peripheral post-training injections of epinephrine or norepinephrine could enhance memory storage processing in a dose-related manner. Van der Kolk, et al. (1985) reported that exposure to IS in animals increased plasma catecholamine levels. Thus,
Figure 1. A Physiological Model of Inescapable Shock (IS)
the traumatic event becomes a learned response such that the stimulus, meaning, and response patterns that are active at the time of the event are etched into a pathologic neurological network (Pitman, 1988). This "superconditioning" accounts for the occurrence of the repetitive intrusive recollections and nightmares that plague PTSD victims (Pitman, 1988). Upon re-exposure to a stressful event, "etching" agents such as vasopressin and ACTH (both released in animals under stress) enhance memory consolidation and retrieval (Zager & Black, 1985).

Another hallmark of PTSD is the clinical symptomatology of hyper-reactivity, i.e., exaggerated startle response, irritability and explosive outbursts (American Psychiatric Association, 1987). Van der Kolk, et al. (1985) postulated that this hyper-reactivity is a result of chronic adrenergic hypersensitivity following transient catecholamine depletion from trauma. Anisman and Sklar (1979) reported that uncontrollable shock (IS) in rats induced a transient depletion of hypothalamic norepinephrine (NE). A reintroduction of ten shock trials with the same rats elicited a NE depletion, a treatment that was ordinarily without effect on levels of hypothalamic NE in naive animals (Anisman & Sklar, 1979). Anisman and Sklar (1979) concluded that the reintroduction of stressors (IS) resulted in exaggerated neurochemical changes. Van der Kolk, et al. (1985) hypothesized that such a chronic depletion of NE resulted in a tonic underaction of NE-driven behavior, with a phasic overactivation of NE-driven behavior following transient stimulation.

Endogenous opioid withdrawal has also been hypothesized to be contributive to the hyper-reactivity seen in PTSD (Van der Kolk, et
Opioids, specifically beta-endorphins, are released in response to stress by the pituitary (Maier, et al., 1980) and demonstrate an analgesic effect in response to stress (Watson, Hoffman & Wilson, 1988). Opioids reduce the firing of neuronal cells in the LC, which is dense in opioid receptors (Van der Kolk, et al., 1985). In one animal study, chronically administered morphine effected LC neuronal cells such that they became tolerant to the inhibitory effects of morphine after four to five days of treatment (Aghajanian, 1978). Naloxone administration to these tolerant animals more than doubled the spontaneous discharge rate of the LC neuronal cells (Aghajanian, 1978). Hoffman, Watson, Wilson and Montgomery (1989) hypothesized that PTSD victims provoke stressors to promote opioid release to overcome opioid withdrawal leading to endogenous opioid addiction. The opioids provide the PTSD victim a transitory sense of control that disappears with withdrawal of the stressful stimulus. The consequent withdrawal of the traumatic trigger (IS) then leads to physiological symptoms of opiate withdrawal; anxiety, hyper-reactivity and aggressive outbursts, all of which are documented PTSD symptomatology. Van der Kolk, et al. (1985) postulated that conditioned endogenous opiate withdrawal was not solely responsible for the hyper-reactivity seen in PTSD; rather, that massive trauma resulted in a vulnerability to respond with excessive autonomic reactivity by altering LC activity. Thus the hyper-reactivity seen in PTSD would be further increased by endogenous opioid fluctuations in response to stress re-exposure (Van der Kolk, et al., 1985). Eventually, the PTSD victim becomes opioid
tolerant leading to stress addition in order to maintain the level of endogenous opioids (Watson, et al., 1988).

The animal model of IS provides a physiological framework for elucidating the concept of PTSD. In particular, the model provides a biochemical basis for the behavioral changes seen in PTSD. The conceptual model, as illustrated in Figure 2, represents a traumatic injury as inescapable shock. As a result of a traumatic injury, the victim undergoes physiological changes resulting in behavioral alterations. Thus, the entire physiological cascade of altered LC activity, chronic adrenergic hyperactivity and endogenous opioid depletion provokes the behavioral alterations seen in PTSD, namely; anxiety, exaggerated startle responses, difficulty falling asleep, hypervigilance and irritability. Upon re-exposure to either an event the victim perceives as traumatic or a symbolic representation of the event, the iniquitous cycle begins again. It is also possible that PTSD victims, in an attempt to bolster dwindling endogenous opioid stores, become "thrill-seekers". They become avidly preoccupied with repetition of the trauma (Van der Kolk, et al., 1985).

The animal model of IS provides a physiological basis for interpreting pathopsychology subsequent to a traumatic injury. As such, it can function as a springboard for predicting traumatically injured patients at risk for developing PTSD symptomatology.

Problem Statement

Currently, traumatically injured victims are the "homeless" of the health care system. They lack any sort of systematic psychological follow-up care addressing their specific needs (Peterson &
Figure 2. A Conceptual Model Articulating Physiological and Behavioral Alterations in Post-Traumatic Stress Disorder (PTSD)
Therefore, this study addressed the question: is non-combat traumatic injury associated with the development of PTSD symptomatology?

**Research Questions**

1. Is there a statistically significant relationship between severity of injury and the level of PTSD symptomatology?
2. Is there a statistically significant relationship between length of hospital stay and the level of PTSD symptomatology?
3. Is there a statistically significant relationship between subject reported late negative effects from the traumatic injury and PTSD symptomatology?

**Definition of Terms**

1. **Post-traumatic stress disorder (PTSD)**
   
   Theoretical - PTSD describes psychological symptoms resulting from extremely serious life events that substantially hinder normal functioning (Brom, Defares & Kleber, 1989).
   
   Operational - A cluster of symptoms defined by the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders, 3rd Edition, Revised, 1987* as measured by the Modified Late Effects of Accidental Injury Questionnaire Part II (MLEAIQ-II) (adapted from Malt, Blikra & Hoivik, 1989) and the Revised Impact of Event Scale (RIES) (Horowitz, Wilner & Alvarez, 1979).
2. Traumatic injury
   a. Physiologic
      Theoretical - An injury caused by external force or violence (Taber's Cyclopedic Medical Dictionary, 1977).
      Operational - A physical injury involving multiple organ systems as measured by the Injury Severity Score (ISS) (Baker, O'Neill, Haddon & Long, 1974).
   b. Psychological
      Theoretical - "An emotional state of discomfort and stress resulting from memories of an extraordinary, catastrophic experience which shattered the survivor's sense of invulnerability to harm" (Figley, 1985, p. xviii).
      Operational - The emotional impact of a physical injury as measured by the Revised Impact of Event Scale (RIES) (Horowitz, et al., 1979).

3. Length of hospital stay
   Theoretical - The extent in time a person remains in the hospital.
   Operational - The amount of time from hospital admission to hospital discharge as calculated in 24 hour days. A day begins and ends at 2400 hours.

Significance to Nursing
   Trauma is the leading cause of morbidity and mortality up to the age of 34 (Peterson & O'Sharrick, 1986). Traumatic injuries cost the United States approximately 107.3 billion dollars in 1985 (Trimble,
1988). Injuries are responsible for about 7% of health care expenditures and 2% of the United States gross national product (Malt, et al., 1989). Our world is no longer a peaceful place but has become increasingly dangerous and threatening. Helzer, Robins and McEvoy (1987) reported the prevalence of PTSD, in the St. Louis area of the Epidemiologic Catchment Area Survey, as 1% overall, and 3.5% in people exposed to physical attack. As violent traumatic injuries continue to escalate, it is logical to assume a parallel rise in PTSD rates.

The key to successful treatment of PTSD lies in early intervention. An increased interval between the traumatic injury and the time the victim enters treatment is often related to a higher dropout rate from treatment programs; any time after three months the victim begins the process of sealing off the trauma (Mejo, 1990). Unfortunately, in some cases, the guilt and depression associated with PTSD are so severe as to result not only in self-defeating behavior, but suicide (Sonnenberg, 1988).

Traumatically injured victims are often followed in the hospital by a medley of physicians. It is the nurse who provides the oneness of care that continues until hospital discharge. Nurses, because of their continual 24 hour assessment of patients, can quickly identify those victims needing psychiatric intervention following the traumatic injury. However, early identification of the disorder pre-supposes a knowledge of its definition. There are few studies in the nursing literature investigating either PTSD or PTSD in a specific population. Therefore, nurses must first define PTSD, then isolate the disorder
in various populations in order to construct a substantial foundation on which to base interventions.

In their monograph on PTSD, Penk and Robinowitz (1989) noted, "we must continually redefine the old traumas of the past in terms of the new life-threatening experiences of today" (p. 689). As researchers continue to discover the diversity of victims' responses to traumatic injury, the fascination with the traumatic event itself will dissolve. Instead, the victim will become pivotal to the trauma. Nursing, with its emphasis on holistic care, is in a salient position to champion integrating a victim's psychologic self with the biologic self. The formidable nursing icons of prevention, assessment, intervention and education must meet and circumscribe PTSD. Only then can nurses with a unity of vision identify the disorder in the clinical setting and begin to identify its many potentiating variables. Currently, a majority of traumatically injured victims are returned to the community in psychological disarray (Malt, 1988). This is a fertile area where nursing can make a difference by early identification of victims at risk for developing PTSD and then intervening in an effort to return psychologically intact victims to society.

Nursing must continue to propagate missiles that challenge the parameters of what is known in order to remain at the zenith of scientific exploration. This study represents one such missile of inquiry.

**Summary**

Post-traumatic stress disorder (PTSD) can occur following a stressful event that is outside most people's normal experiences.
PTSD has been primarily investigated relative to injured and non-injured combat veterans. There is little nursing research investigating PTSD in a non-combat traumatically injured population. Therefore, the purpose of this study was to determine the relationship between non-combat traumatic injury and the occurrence of PTSD symptomatology.
CHAPTER II

REVIEW OF THE LITERATURE

A selected review of the literature is presented in which physiological markers for PTSD and PTSD in specific populations were examined. Included also is a focused discussion on the hypothesized role of specific variables in predicting PTSD outcome.

"O that this too too sullied flesh would melt,
Thaw, and resolve itself into a dew,
Or that the Everlasting had not fixed
His canon 'gainst self-slaughter. O God, God,
How weary, stale, flat, and unprofitable
Seem to me all the uses of this world!"

(Hamlet, Act I, Scene ii)

Literature relative to PTSD is reviewed, specifically: potential physiological markers for PTSD, immune function and PTSD and different variables associated with PTSD.

Post-traumatic stress disorder (PTSD), albeit by different appellations, has plagued mankind for centuries. The earliest described victim was Achilles in Homer's The Iliad. After fighting the Trojans for nine years, Achilles exhibited violent rages and insane displays of wrath that easily parallel the hyperarousal and irritability noted with PTSD. Hamlet, Shakespeare's "melancholy Dane", affected by his father's untimely death, displayed the numbing of responsiveness and intrusive recollections outlined by the American Psychiatric Association (1987) as symptomatic of PTSD.
Physiological Markers of PTSD

The visage of PTSD, as it is currently known, was not described until after the Viet Nam war. Although the majority of published research on PTSD was conducted on Viet Nam veterans, the disorder has been found in various other groups. A common denominator threading throughout these groups is the physiological anchor weighting the symptomatology associated with PTSD. Kosten, Mason, Giller, Ostroff and Harkness (1987) demonstrated that patients with PTSD had higher sustained levels of urinary norepinephrine and epinephrine than other comparison groups. The researchers studied 44 male patients with diagnoses of PTSD (n=9), major depressive disorder (n=8), manic (n=8), paranoid schizophrenia (n=12), and undifferentiated schizophrenia (n=7). Twenty-four hour urine samples were collected at two week intervals on all subjects. Average number of urine samples was 3.1 samples per subject. Symptom severity among the subjects at the time of the urine samplings was scored using the Brief Psychiatric Rating Scale (BPRS; Kosten, et al., 1987). A motor retardation item on the BPRS estimated subject motor activity on urine collection days. The PTSD patients maintained significantly (p < .05) higher mean urinary norepinephrine levels than all the other patient groups during hospitalization (76 ± 10 micrograms/day). The Duncan's multiple range test indicated significance between group differences, F(4,39) = 6.49, p < 0.0003. The investigators also reported higher mean urinary epinephrine levels in the PTSD group (22.1 ± 2.3 micrograms/day). Again, the Duncan's multiple range test illustrated significance between group differences, F(4,39) = 7.21, p < 0.0002. Kosten, et al. (1987) reported that the
total BPRS scores were not significantly different between the groups. In addition, there were no statistically significant correlations between norepinephrine levels and the motor retardation item on the BPRS. The most important conclusion of this study was the possibility of using urinary norepinephrine and epinephrine as diagnostic markers for PTSD. However, as the researchers noted, the within group subject variability represented a limitation as to the generalizability of their findings. Also, all of the subjects were male. Unfortunately, the researchers did not fully describe the sample thus, it is unclear whether the subjects developed PTSD subsequent to combat experience or other stressful events.

Lerer, Ebstein, Shestatsky, Shemesh and Greenberg (1987) postulated cyclic adenosine 3', 5'-monophosphate (cAMP) signal transduction abnormalities in lymphocytes and platelets as possible biological markers for PTSD. The researchers studied 12 patients with a diagnosis of PTSD: combat veterans (n=5), victims of terrorist activity (n=3), victims involved in motor accidents (n=4) and 10 healthy control subjects. Time elapsed since the traumatic event ranged from one to 12 years. The investigators reported that basal cAMP signal transduction in lymphocytes and platelets, obtained from PTSD patients, was significantly lower than those from ten healthy control subjects; t = 5.20, p < .001. Statistical analyses were not reported for the groups (military veterans, victims of terrorist activity, motor accident victims). Also, differences in cAMP signal transduction relevant to those subjects developing PTSD at one year as opposed to 12 years were not addressed. Lerer, et al. (1987) addressed the "chicken-or-the-
egg" query by stating that it is still unclear whether the cAMP transduction abnormalities seen in PTSD patients are a "trait characteristic or a phenomenon related to the depressed state" (p. 1326). Chronic stress and subsequent biological markers have been investigated. Davidson and Baum (1986) studied chronic stress and PTSD in 52 subjects living within five miles of the Three Mile Island (TMI) nuclear power station. During March 1979, the nuclear power station at TMI accidentally leaked radiation into the environment. The researchers used 35 residents living in a town eight miles from TMI as controls. The revised Symptom Checklist-90 (SCL-90R; Derogatis, 1977) was used to measure self-reported symptoms of stress. A proofreading task was used to measure behavioral aspects of stress. The Impact of Events Scale (IES; Horowitz, et al., 1979) was used to assess level of PTSD symptomatology. An inventory measuring sensation seeking (Zuckerman, 1975) was used to measure a pattern of response associated with PTSD. Thirteen Interpersonal Problem items that discriminated PTSD victims from non-PTSD victims (Roberts, 1982) were used to further define the occurrence of PTSD symptomatology. A 15 hour urine collection was obtained from all subjects. Subsequently, assays of the urine for epinephrine, norepinephrine and cortisol were performed. Blood pressure and heart rate were also measured (Davidson & Baum, 1986).

The findings confirmed the investigators' hypothesis that TMI subjects would demonstrate higher levels of stress. On the SCL-90R, the TMI residents reported significantly (p < .05) more symptoms of distress ($\bar{x} = 34.6$) than did control subjects ($\bar{x} = 16.1$). TMI area subjects were able to identify significantly (p < .05) fewer errors
on the proofreading task ($\bar{x} = 35.5\%$) than the controls ($\bar{x} = 60.5\%$).

TMI area residents experiencing PTSD symptoms exhibited significantly
($p < .05$) higher levels of urinary norepinephrine and significantly
($p < .05$) higher mean resting systolic and diastolic blood pressures
(Davidson & Baum, 1986). This finding is particularly relevant con­sidering that the subjects were studied five years after the original
accident. One of the more important findings of this study was that
TMI area residents exhibiting symptoms of PTSD (as measured by the
IES) exhibited significantly ($p < .05$) greater levels of chronic stress
(Davidson & Baum, 1986). Symptom reporting on the SCL-90R was also
higher among those TMI area residents reporting more intrusive symptoms.
The investigators concluded that PTSD symptoms may be associated with
less intense but persistent events (Davidson & Baum, 1986). One flaw
in this study was the lack of any systematic subject screening prior
to commencing the investigation. Pre-existing psychopathology could
have influenced subjects' responses. Cumulative stress since the
accident could have influenced physiological measures as there was
no attempt to investigate life events stress subsequent to the accident.

Low plasma Beta endorphins were postulated as another physiologic
Subjects were 21 male Viet Nam veterans and 20 age and gender matched
controls. Serum cortisol, serum adrenocorticotrophin (ACTH) and plasma
Beta endorphin levels were measured once in the morning and once in
the afternoon for one day. The subjects completed questionnaires on
the day of sampling to record the presence of any unusual stressors,
illnesses or use of drugs and/or alcohol. The investigators reported
that an ANOVA (two groups x two times a day) on plasma Beta endorphin levels produced a highly significant main effect for groups (F 1,39 = 12.841, p = .0009) with the Viet Nam veteran subjects having lower levels than controls (Hoffman, et al., 1989). The researchers were unable to confirm if the low plasma Beta endorphins in PTSD had a role in the pathogenesis and perpetuation of the disorder. Not surprisingly, the researchers also noted a rise in subjects' serum cortisol in relation to psychological stress (Hoffman, et al., 1989).

The type of stressor and subsequent immune function was investigated by Laudenslager, Ryan, Drugan, Hyson and Maier (1983). Using rats, these investigators found that inescapable versus escapable shock suppressed lymphocyte proliferation (Laudenslager, et al., 1983). They postulated that the controllability of stressors is critical in sustaining immune function (Laudenslager, et al., 1983). In a similar study, a group of rats were implanted with a tumor preparation. A total of 63% of the rats that received escapable shock rejected the tumor whereas only 27% of the rats that received inescapable shock rejected the tumor (Visintainer, Volpicelli & Seligman, 1982). These data lead one to speculate that inescapable shock makes one more vulnerable to physiologic illness secondary to immune response suppression. However, this has not been evaluated specifically in PTSD subjects.

Variables Associated with PTSD

Premorbid Status

McFarlane (1988) studied a group of 45 Australian firefighters eight months after exposure to an intense bushfire disaster. Eleven
subjects who developed PTSD were compared to 34 subjects who did not develop PTSD. The 12-item General Health Questionnaire (GHQ; Goldberg, 1972) and Eysenck Personality Inventory (EPI; Eysenck & Eysenck, 1964) were administered during structured interviews. The PTSD group scored significantly \( p < .05 \) higher on the neuroticism scale (PTSD group \( \bar{x} = 11.1 \); non-PTSD group \( \bar{x} = 6.3 \)) and significantly \( p < .05 \) lower on the extraversion scale of the EPI than the non-PTSD group (PTSD group \( \bar{x} = 9.5 \); non-PTSD group \( \bar{x} = 13.0 \)). The investigator reported that a family history of psychiatric disorder was significantly \( p < .05 \) greater in the PTSD group as compared to the non-PTSD group (chi squared = 4.63). McFarlane (1988) concluded that premorbid status, specifically; introversion, neuroticism and a personal or family history of psychiatric disorder, was significantly associated with the development of PTSD. Surprisingly, the intensity of exposure, perceived threat and any losses sustained in the disaster did not predict PTSD. These findings are representative of results from the study done by Helzer, Robins and McEvoy (1987) exploring PTSD in the general population. The researchers interviewed 2,493 subjects as part of a nationwide general population survey of psychiatric disorders. Psychiatric diagnoses were made using the Diagnostic Interview Schedule (Robins, Helzer, Croughan, Williams & Spitzer as cited by Helzer, et al., 1987). The researchers concluded that PTSD could be predicted by a subject's history of behavioral problems before the age of 15. Specific childhood behavioral problems such as fighting, vandalism and substance abuse were targeted as predictors of PTSD. Kolb (1989) postulated that "early
life exposure to physical and emotional abuse, by others, hypersensi-
tizes the neural system and establishes the neurophysiological
groundwork for more permanent change in the face of massive terrifying
exposures in childhood" (p. 823). Horowitz (1986) also stated that
a person is more likely to develop symptoms after a stressful life
event if they have experienced previous trauma.

The results of these studies are in direct contrast to studies
examining Viet Nam veterans. The majority of these studies found that
a poor premorbid adjustment did not correlate with the development
of PTSD. Rather, the intensity of combat or the level of exposure
to combat correlated strongly with PTSD symptomatology (Solkoff, Gray
& Keill, 1986; Ursano & Rundall, 1990; Resnick, Foy, Donahue & Miller,
1989). Although the argument attempting to link premorbid status with
the development of PTSD rages on in the literature, it is interesting
to note that those studies denying premorbid status as a causative
variable revolve around the Viet Nam veteran. Studies supporting pre­
morbid status as a viable link to PTSD center on civilian-related
trauma. Perhaps while war represents an event that is "outside the
range of usual human experience and would be markedly distressing to
almost anyone" (American Psychiatric Association, 1987), it is unclear
whether civilian-related trauma meets this stressor criterion.

Stressor Criterion

Ursano (1987) discussed the "quantity" of a stressor versus
the "quality" of a stressor. He vehemently argued that it is the
magnitude of the stressor as opposed to any particular class of stressor that is best predictive of PTSD symptomatology (Ursano, 1987).

Weisaeth (1989) found that the frequency and intensity of PTSD reactions were linked to the severity of the stress exposure in 246 subjects exposed to an industrial explosion accident in Norway. Subjects were divided into stress exposure categories contingent on their proximity to the explosion. Those closest to the explosion were placed in the "high stress exposure group" (Group A; n=66) whereas those subjects not at work when the explosion occurred were used as controls and placed in the "low stress exposure group" (Group C; n=121). Group B (n=59) was the "medium exposure group" and included those subjects who, by their proximity to the explosion, had reason to believe that they were in danger. Afterwards, it was discovered that this group was in no immediate danger from the explosion. Group A experienced more deaths and physical injuries as well as a higher intensity of visual, acoustical and mechanical impact consequent to the explosion. Interviews were conducted immediately after the explosion and again at seven months post-explosion. The State Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1970) provided an assessment of the subjects' general anxiety level. A PTSD symptom checklist presented 30 possible symptoms representative of PTSD. Scores on the State Anxiety Inventory reflected that Group A reported more anxiety than either Group B or Group C; $\bar{x} = 40.9$, $\bar{x} = 32.4$, $\bar{x} = 31.5$, respectively. At seven months, Group A demonstrated more frequent and severe PTSD symptoms than either Group B or Group C as determined by frequency counts for each item on the PTSD symptom checklist. The investigator reported that these
findings were consistent with the subject interviews he conducted seven months post-disaster. Weisaeth (1989) concluded that the findings represented a significant link between the frequency and intensity of PTSD and the severity of the stress exposure.

The severity of a stressor was also positively associated with psychopathology in a study investigating survivors of a supper club fire (Green, Grace & Gleser, 1985). It has been noted that PTSD is more severe and longer lasting when the stressor is man-made rather than a natural disaster (Creamer, 1990). In addressing the stressor criterion, Malt (1988) concluded that PTSD seldom occurs after accidental injuries claiming that "most accidents are not sufficient to evoke clinically significant symptoms of post-traumatic anxiety" (p. 816). However, Malt's research involved accident victims with a mean Injury Severity Score (ISS) of 8.6 which represents a fairly low severity of injury; range 0 - 75.

Patterson, Corrigan, Questad and Robinson (1990) concluded in their study of 54 burn patients that the severity of injury, as measured by total body surface area of burn (TBSA), was related to the development of PTSD ($r = 0.530$, $p < 0.05$). These findings are contrary to those found in a similar study done by Tucker (1987). In studying inpatient and outpatient adult burn victims ($n=31$), Tucker (1987) concluded that burn severity does not predict poor psychosocial outcome. Burn severity was measured by several indices, namely: percent of mean body surface area burned, mean hospital stay, mean number of operations, facial burns and hand burns. Tucker (1987) reported that the measures of outcome were assessed by the Psychosocial Adjustment to Illness
Scale (PAIS; Derogatis, 1976) that measured the impact of illness on psychosocial functioning, the Diagnostic Interview Schedule for Post-Traumatic Stress Disorder (DIS-PTSD; Robins, Helzer & Groughan, 1981) that detected stress-induced anxiety neurosis and the Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The indices of burn severity were not significantly correlated with the outcome measures.

Modulating Mechanisms

Curran, Bell, Murray, Loughrey, Roddy and Rocke (1990) hypothesized that the "cossetted" hospital environment may serve as a protective mechanism for the physically injured that possibly delays the development of PTSD until after hospital discharge. In comparing the two previously discussed studies, the mean number of inpatient hospital days reported in the first study by Patterson, et al. (1990) was 27.5 days with burn severity predicting the development of PTSD whereas the mean number of inpatient hospital days in the study reported by Tucker (1987) was 45 days with no relationship found between burn severity and PTSD development but with a high incidence of PTSD found among outpatients (Tucker, 1987). Tentatively speaking, in the study done by Tucker (1987), the "cossetted" hospital environment (length of hospital stay = 45 days) could indeed have prevented the inpatients from developing PTSD symptomatology. The outpatients could have been protected by the hospital environment (length of hospital stay = 78 days) and consequently did not exhibit PTSD symptoms until one year post-hospital discharge. Obviously in most cases, an increased severity
of injury results in a longer hospital stay. If the hospital environ-
ment delays an injured patient from developing PTSD, then more severely
injured patients should exhibit less psychopathology immediately post-
discharge than those less severely injured with subsequently shorter
hospital stays.

Social support as a predictive variable for PTSD was examined
in several studies involving Viet Nam veterans (Norman, 1988; Escobar,
et al., 1983; Green & Berlin, 1987). These studies concluded that
a small, poorly defined social support network was positively related
to the development of PTSD. Lindy (1985) introduced the term "trauma
membrane" to describe a protective wall established around the victim
by family and friends. Mejo (1990) noted that there was a need for
longer-range supportive recovery environments because of the length
of time it took for people to recover from traumatic injuries.

In summary, the majority of PTSD research can be divided into
three discrete categories: 1) physiological hypotheses for PTSD; 2)
PTSD in a specific population; and 3) variables associated with the
development of PTSD. There is little definitive research investigating
the psychological response of victims following a traumatic injury.
Research is scarce that investigates who develops PTSD and who does
not when exposed to the same stressor. In discussing Viet Nam veterans
with PTSD, Penk and Robinowitz (1987) noted that health care profes-
sionals forgot the person embedded in PTSD. They postulated that health
care givers aligned themselves with the victim's way of coping with
trauma; that is, coping by avoiding. They stated that health care
workers have "helped those who cope by forgetting cope by (the health
care workers) forgetting" (Penk & Robinowitz, 1987, p. 5). These researchers cautioned that it is time to look beyond what happens after the trauma has ended, and, in so doing, begin to learn about the contributions of trauma to our everyday lives (Penk & Robinowitz, 1987).

Summary

Several investigators have pioneered studies that have postulated diagnostic and preventive indices for PTSD. These are important studies. The physiological alterations seen with PTSD add ballast to the proposition that PTSD is more than a behavioral disorder. In addition, these studies have provided direction for future interventions. Finally, the identification of possible predictive variables associated with PTSD represents an exciting development towards early recognition of those persons at risk for developing PTSD.
CHAPTER III

METHODOLOGY

This chapter consists of three sections. Section one presents the research design, investigated variables and research hypotheses. The second section is focused on the setting, sample, instruments and procedure for data collection. The third section describes the protection of human subjects. The purpose of this study was to determine the relationship between traumatic injury and the occurrence of PTSD symptomatology.

Research Design

A descriptive correlational design was used in this research to investigate if the variables under study systematically varied together (Waltz & Bausell, 1981).

Variables

The independent variables were: the severity of injury as measured by the Injury Severity Score (ISS; Baker, et al., 1974), length of hospital stay (LOS), and subject reported late negative effects from the traumatic injury as measured by the Modified Late Effects of Accidental Injury Questionnaire, Part I (MLEAIQ-I; adapted from Malt, et al., 1989). The dependent variable was the incidence of PTSD symptomatology as measured by the Modified Late Effects of Accidental Injury Questionnaire, Part II (MLEAIQ-II; adapted from Malt, et al., 1989).
1989) and the Revised Impact of Events Scale (RIES; Horowitz, et al., 1979). Descriptive data relative to subject's age, gender, ethnicity, level of education, marital status, past hospitalizations, major life upsets other than the traumatic injury, and employment status were collected via a demographic collection form. These data were not used in statistical analyses. Rather, the data were discussed in light of the findings associated with the independent and dependent variables.

**Data Analysis**

Pearson product-moment correlation was used to determine the relationship among the variables in hypotheses one through eight. Descriptive statistics were used to evaluate the demographic data. The data analysis addressed research questions one through three and hypotheses one through eight.

**Research Questions**

**Research Question 1.** Is there a statistically significant relationship between severity of injury and the level of PTSD symptomatology? This question was analyzed using Pearson product-moment correlation coefficient to determine if a relationship existed between the severity of injury score and the level of PTSD symptomatology obtained by the MLEAIQ-II and the RIES.

**Research Question 2.** Is there a statistically significant relationship between length of hospital stay and the level of PTSD symptomatology? This question was analyzed using Pearson product-moment correlation to determine if a relationship existed between length of
hospital stay and the level of PTSD symptomatology obtained by the MLEAIQ-II and the RIES.

**Research Question 3.** Is there a statistically significant relationship between subject reported late negative effects of a traumatic injury and PTSD symptomatology? This question was analyzed using Pearson product-moment correlation to determine if a relationship existed between late negative effects from a traumatic injury and the level of PTSD symptomatology obtained by the MLEAIQ-II and the RIES.

**Hypotheses**

The following null hypotheses were tested at the alpha = .05 level of significance:

**H0-1.** There will be no statistically significant relationship between severity of injury and the level of subject reported negative late effects from a traumatic injury (MLEAIQ-I).

**H0-2.** There will be no statistically significant relationship between the severity of injury and the level of PTSD symptomatology assessed by a 26-item symptom checklist (MLEAIQ-II).

**H0-3.** There will be no statistically significant relationship between the severity of injury and the level of PTSD symptomatology assessed by the impact of the event (RIES).

**H0-4.** There will be no statistically significant relationship between length of hospital stay and the level of subject reported negative late effects from a traumatic injury (MLEAIQ-I).
HO-5. There will be no statistically significant relationship between length of hospital stay and the level of PTSD symptomatology assessed by the 26-item symptom checklist (MLEAIQ-II).

HO-6. There will be no statistically significant relationship between length of hospital stay and the level of PTSD symptomatology assessed by the impact of the event (RIES).

HO-7. There will be no statistically significant relationship between subject reported late negative effects of a traumatic injury (MLEAIQ-I) and the level of PTSD symptomatology assessed by a 26-item symptom checklist (MLEAIQ-II).

HO-8. There will be no statistically significant relationship between subject reported late negative effects of a traumatic injury (MLEAIQ-I) and the level of PTSD symptomatology assessed by the impact of the event (RIES).

Setting

This study was conducted in two level III trauma departments both associated with large southwestern medical centers. One center represented approximately 200-300 beds, while the second center represented approximately 600 beds. As level III institutions, both centers served as regional trauma referral centers. Both trauma departments utilized aeromedical support to provide service to surrounding rural communities. The patient populations seen in these trauma departments were typical of patients at various other level III trauma departments across the United States. The setting for subject completion
of mailed questionnaires was whatever location the subject deemed appropriate and/or convenient.

**Subjects**

Identification of subjects who met the study criteria was accomplished by reviewing trauma records from the above mentioned trauma departments for the time period January 1, 1990 to May 30, 1991.

The subjects included in this study were selected based on the following criteria:

1. Were between 18 to 70 years of age.
2. Able to read, speak and understand English.
3. Sustained a traumatic injury with an ISS score between eight to 75.
4. Required a minimum length of hospital stay of three days within the level III institution as a result of the traumatic injury.

The ISS values for subject inclusion were set at eight to 75 in an effort to provide a spectrum of subjects with minor injuries (eight) to severe injuries (75). Subjects were excluded if they sustained a head injury or any type of burn, been raped or physically abused or had any pre-existing psychopathology. Head injured victims were excluded due to the potential for eclipsing the physiological basis postulated for PTSD as described in Chapter One. Raped and physically abused victims were excluded due to the social stigmas attached to these types of injuries as opposed to other traumatic injuries such as motor vehicle accidents. Burned patients were excluded
due to the long-term rehabilitation and physical disfigurement associated with this type of injury.

Instruments

The following instruments were used in this research:

Injury Severity Score (ISS)

The ISS was used to assess the extent of the subject's traumatic injury. The ISS was developed by Baker, et al. (1974) to evaluate motor vehicle victims with multiple injuries. The ISS is calculated by first completing the Abbreviated Injury Scale (AIS-80; American Association for Automotive Medicine, 1980) which divides the body into seven regions. For each of the regions, a severity code is derived that describes the individual injuries (Greenspan, McLellan & Greig, 1985). The ISS is then determined by adding the squares of the highest AIS codes in each of the three most severely injured body regions (Baker, et al., 1974). The ISS provides a numerical rating for traumatized victims that characterizes the total victim (Greenspan, et al., 1985). For example:

**EXAMPLE 1**

<table>
<thead>
<tr>
<th>Injury</th>
<th>AIS</th>
<th>ISS Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carotid artery laceration</td>
<td>4^2</td>
<td>Head/neck</td>
</tr>
<tr>
<td>Femur, undisplaced fracture</td>
<td>3^2</td>
<td>Extremities</td>
</tr>
<tr>
<td>Leg laceration</td>
<td>1^2</td>
<td>External</td>
</tr>
</tbody>
</table>

\[
\text{ISS} = 26 \ (16 + 9 + 1)
\]

(The Abbreviated Injury Scale 1985 Revision; American Association for Automotive Medicine)
The range of the ISS is 0 - 75. For the purposes of this study, the ISS provided an injury severity value and was also used to assist in subject selection.

Reliability and validity for this instrument have not been reported. However, the ISS is an accepted instrument, in several trauma departments, and is used as an outcome measure as well as a means for categorizing patients listed in a trauma register (M. A. Matter, personal communication, February 7, 1991).

Concurrent validity of the ISS was established by Stoner, Barton, Little and Yates (1977). The authors used plasma cortisol concentration, which they reported to be a sensitive measure of injury severity, as a concurrent measure for the ISS. Plasma cortisol concentrations were obtained from two groups of accident patients with ISS scores equal to four (Group 1, n=50) and equal to nine (Group 2, n=47). The plasma cortisol concentrations were consistently higher in the patients with an ISS of nine (Stoner, et al., 1977). The investigators reported that the difference in injury severity contributed significantly to the between group variance, \( F = 14.04, p < 0.005 \) (sample was drawn within eight hours after injury and 12 hours of eating); \( F = 10.84, p < 0.005 \) (sample was drawn within eight hours after injury and 24 hours of eating); \( F = 7.52, p < 0.01 \) (sample was drawn within 31 hours after injury and 24 hours of eating). The investigators concluded that the difference in plasma cortisol between the two groups confirmed the difference in the severity of their injuries, as measured by the ISS (Stoner, et al., 1977).
In the current study, subject ISS was calculated using the Hospital Trauma Register (HTR) version 4.1 (Cales, 1986). The HTR is an integrated software package that calculates the ISS directly from the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM). The HTR is based on a program from Johns Hopkins University which describes a computerized table that converts ICD-9-CM hospital discharge diagnoses to an Abbreviated Injury Score (AIS). The AIS, which characterizes severity of anatomic injury, in turn provides the basis for calculating the ISS. Both of the trauma departments used in this study rely on the HTR to assess the quality of trauma care.

The Modified Late Effects of Accidental Injury Questionnaire Part I (MLEAIQ-I) and Part II (MLEAIQ-II) (Appendices A and B)

The Late Effects of Accidental Injury Questionnaire (LEAIQ) was first developed by Malt in 1979 (Malt, et al., 1989). The questionnaire is a self-report instrument used to assess the late effects of traumatic injuries. The original questionnaire consisted of 20 questions with varying numbers of multiple choice responses (Appendix C). However, it lacked a scoring method. Therefore, the principal investigator of the current study redesigned the LEAIQ in order to derive a score based on a Likert scale. The original questionnaire was divided into two parts, Part I and Part II. The modified questionnaire, Part I (MLEAIQ-I) addressed the late effects of traumatic injury and consisted of 12 items that addressed social, psychological, economic and physical alterations as a consequence of a traumatic injury. Subjects checked
the response most closely corresponding to their present situation. Responses were coded one, two or three. The codes were valuative and represented; no changes as a result of a traumatic injury (one), positive changes since the injury (two) or negative changes since the injury (three).

The modified LEAIQ, Part II (MLEAIQ-II), is a 26-item checklist that presented symptomatology consistent with PTSD. Malt, et al. (1989) based the original 24-item symptom checklist on numerous questionnaires and reported that seven of the items corresponded to questions found in the 18-item Health Opinion Survey (Leighton & Leighton, 1965) and ten items corresponded to questions found in the 22-item Langner scale (Langner, 1962). Eight of the symptoms corresponded to the DSM-III-R criteria for major depression and 12 of the symptoms paralleled the criteria for anxiety disorders (Malt, et al., 1989). Modifications to the original instrument are noted in Appendix D. On the original questionnaire, subjects checked those symptoms they had experienced during the previous six months. A Likert scale was developed on the modified questionnaire (MLEAIQ-II), with the ratings ranging from: (1) not at all, (2) rarely, (3) sometimes, and (4) often. Subjects indicated those symptoms, based on the above scale, which they had experienced during the past month. An item was considered to have been positively endorsed if subjects checked any of the following ratings: rarely, sometimes, or often. Mean scores were calculated based on the Likert scale values of one for negative endorsement and two, three, or four for the three degrees of positive endorsement.
Interrater reliability for the original instrument was reported using Cohen's kappa. The overall interrater reliability was $k = 0.78$ (Malt, et al., 1989). Reliability analysis of the original 24-item checklist yielded a Cronbach's alpha value of $0.89$ (Malt, et al., 1989). There are no published data describing the use of the LEAIQ in the United States.

Impact of Event Scale (IES) (Appendix E)

The IES, developed by Horowitz, Wilner and Alvarez (1979) was used to assess subjects' experiences of intrusion and avoidance episodes relative to the traumatic injury. Both experiences are characteristic symptoms of PTSD (American Psychiatric Association, 1987). Zilberg, Weiss and Horowitz (1982) defined intrusion episodes as intrusively experienced ideas, images, feelings or bad dreams subsequent to a stressful event. The avoidance experience consisted of consciously recognized avoidance of certain ideas, feelings, or situations evocative of the stressful event (Zilberg, et al., 1982). The scale consists of 15 items; seven of which describe episodes of intrusion while eight items describe episodes of avoidance (Horowitz, et al., 1979). Subjects were directed to indicate whether or not each item has been experienced within the past month. The subject then rated the item for frequency (not at all, rarely, sometimes, often; Horowitz, et al., 1979). Mean scores for the tool were derived by assigning a weight for each item of zero for negative endorsement and one, three or five for the three degrees of positive endorsement for frequency (Horowitz, et al., 1979). The split half reliability of the total scale was reported as $r = 0.86$. 
Internal consistency of the subscales (calculated using Cronbach's alpha) was: intrusion = 0.78 and avoidance = 0.82 (Horowitz, et al., 1979). Test-retest reliability was reported as 0.87 for the total stress scores, 0.89 for the intrusion subscale and 0.79 for the avoidance subscale (Horowitz, et al., 1979).

Procedure

Trauma records from the trauma department of the level III institutions were used to obtain the names of those patients traumatically injured and treated in the emergency department between January 1, 1990 and May 30, 1991. The hospital records of patients meeting the criteria for inclusion were reviewed by the investigator. A data collection packet consisting of a demographic questionnaire, the MLEAIQ-I, MLEAIQ-II and the RIES was mailed to 138 non-randomized potential subjects. Subjects completed the questionnaires at a setting of their choice. The mailings were arranged so that subjects received the packets no sooner than one month and no later than two years after discharge from the hospital. Subjects, who agreed to participate, were asked to complete the MLEAIQ-I, MLEAIQ-II, RIES and demographic form and return the questionnaires to the principal investigator within one week after receiving the forms. Follow-up of failed questionnaire returns was accomplished by mailing the subjects a postcard requesting that they complete and return the questionnaires. The subjects recruited from one of the trauma centers received a two-dollar bill when they returned the completed questionnaires.
Protection of Human Subjects

The proposed research was approved by the University of Arizona Human Subjects Committee, the University of Arizona College of Nursing Human Subjects Committee, and the Tucson Medical Center Human Research Committee. A consent form was included in the packet. Subjects were asked to sign the consent form and return it with the completed forms. Participation in the study was voluntary and, as such, subjects were able to withdraw from the study at any time. Anonymity was assured in that all data collection instruments were coded by number and only the principal investigator had access to the subject's identity. All data were maintained by the principal investigator in a locked file cabinet and will be destroyed upon the completion of data analysis and/or publication of results. Any subject who indicated the need for further medical and/or psychological intervention was referred to their primary health care provider.

Summary

The research methodology that was used to complete the study was presented in this Chapter. A descriptive correlational design was used to explore relationships between levels of PTSD symptomatology and injury severity, length of hospital stay and subject reported late negative effects from a traumatic injury. Criteria for the inclusion of subjects were discussed as well as the protocol for protection of human subjects. The procedure for data collection and data analysis was described.
CHAPTER IV

ANALYSIS AND PRESENTATION OF DATA

The purpose of this study was to determine the relationship between non-combat traumatic injury and the occurrence of post-traumatic stress disorder (PTSD). The study was conducted at two large southwestern trauma centers. The subjects (n=33) included persons who had been seriously injured in traumatic accidents. The subjects completed the Modified Late Effects of Accidental Injury Questionnaire, Part I (MLEAIQ-I) to assess any negative late effects from traumatic injury, the Modified Late Effects of Accidental Injury Questionnaire, Part II (MLEAIQ-II) to measure the incidence of symptomatology associated with PTSD and the Revised Impact of Event Scale (RIES) to measure the incidence of PTSD symptomatology as defined by intrusion and avoidance experiences. A description of the sample, psychometric evaluation of the instruments, and findings related to hypotheses testing will be discussed in this Chapter.

Description of Subjects

The 33 subjects who participated in this study met the criteria for a traumatic injury as well as all other subject inclusion criteria as defined in Chapter One. Table 1 illustrates the demographic data of subjects in this study. The sample consisted of 22 males and 11 females. Ages ranged from 18 to 67 years with the mean age of 39 years, SD 15.5. Fifty-eight percent (n=19) of the sample were currently
### Table 1. Descriptive Characteristics of Sample Population (n=33)

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SEX</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>22</td>
<td>67</td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>33</td>
</tr>
<tr>
<td><strong>AGE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 27 Years</td>
<td>11</td>
<td>33</td>
</tr>
<tr>
<td>31 - 38 Years</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>42 - 49 Years</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>50 - 58 Years</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>60 - 67 Years</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td><strong>EMPLOYMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>19</td>
<td>58</td>
</tr>
<tr>
<td>Not Employed</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Retired</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Student</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>EDUCATION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>21</td>
<td>64</td>
</tr>
<tr>
<td>High School</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Grade School</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td><strong>CULTURAL BACKGROUND</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>26</td>
<td>81</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td><strong>MARITAL STATUS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>16</td>
<td>49</td>
</tr>
<tr>
<td>Single</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Widowed</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Divorced</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>
employed, 24% (n=8) were unemployed, 15% (n=5) were retired and one was a student. The majority of subjects were college educated (64%, n=21) and non-Hispanic white persons (81%, n=26). Of the remaining subjects, 19% were Asian (n=1) or Hispanic (n=5). Forty-nine percent (n=16) of the sample were married, 30% (n=10) were single, 6% (n=2) widowed and 15% (n=5) divorced.

Severity of injuries for the subjects, as represented by the Injury Severity Score (ISS), ranged from eight (minimally injured) to 22 (severely injured), possible range 0 to 75, with a mean of 14, SD 4.67. Mean length of hospital stay was 8.9 days, SD 6.11. More than 90% of the traumatic injuries were caused by a motor vehicle accident. The time elapsed between hospital discharge and the time subjects completed their questionnaire packets ranged from one month to 18 months with a mean of six months, SD 4.54.

Subjects were requested to describe any permanent physical changes resulting from the traumatic injury; 90% (n=26) described permanent physical changes (Appendix F). Ninety-one percent (n=29) indicated the injury had led to reduced physical function. Fifty-three percent (n=17) indicated they would like further help with either ongoing physical (n=14) or psychological (n=3) conditions.

Seventy-two percent (n=23) of the subjects indicated they had not required further hospitalization since the original injury while 28% (n=9) reported they had been hospitalized since the injury. Fifty-two percent (n=17) of the subjects reported major life disruptions (Appendix G) other than the traumatic injury within the past year while 49% (n=16) reported no other major life disruptions.
Subjects were asked to list deficiencies in the medical treatment. Although 54% (n=18) of the subjects reported deficiencies, 64% indicated they would not change anything about the hospital treatment and/or arrangements for further check-ups after leaving the hospital. Table 2 illustrates the type and frequency of reported deficiencies.

Instrument Data

The Modified Late Effects of Accidental Injury Questionnaire (MLEAIQ-I)

The MLEAIQ-I was used in this study to assess subject reported late negative effects in various life areas that resulted from a traumatic injury. Subjects' responses are summarized in Table 3.

Change in Occupation and Work Time

Fifty-eight percent (n=19) of the subjects reported their occupation had changed for the worse because of the injury, 39% (n=13) had not changed their occupation and one subject reported their occupation had changed for the better because of the injury. Sixty-one percent (n=20) indicated they had worked little or not at all since the injury, 27% (n=9) have worked most of the time since the injury and 12% (n=4) have worked full time since the injury. Overall, the majority of subjects in this study had a change for the worse in their occupation and had been forced to reduce work time because of a traumatic injury.

Leisure

Pleasure from "fun time" had decreased since the injury as reported by 69% (n=22) of the sample. Twenty-five percent (n=8) noted
Table 2. Subject Report of Items Lacking in Their Medical Treatment (n=18)

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient or incomplete</td>
<td>9</td>
<td>50</td>
</tr>
<tr>
<td>medical evaluation/followup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of information about the</td>
<td>9</td>
<td>50</td>
</tr>
<tr>
<td>nature of the injury and/or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>consequences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of an opportunity to talk</td>
<td>7</td>
<td>39</td>
</tr>
<tr>
<td>about fear, anxiety and other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>feelings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of information to my family</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Other (Subject Specified Items)</td>
<td>6</td>
<td>33</td>
</tr>
<tr>
<td>- &quot;Clavicle was not straightened</td>
<td></td>
<td></td>
</tr>
<tr>
<td>out very well.&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- &quot;The doctors are so afraid that</td>
<td></td>
<td></td>
</tr>
<tr>
<td>you're going to get hooked that</td>
<td></td>
<td></td>
</tr>
<tr>
<td>they stop the pain medication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>before you're really pain free.&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- &quot;Sensitivity upon arrival to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hospital.&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- &quot;Insensitivity of X-ray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>technicians.&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Teach the staff to be a little</td>
<td></td>
<td></td>
</tr>
<tr>
<td>more compassionate.&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Subject Report of Changes in Various Life Areas After a Traumatic Injury

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WORK/OCCUPATION</strong></td>
<td></td>
</tr>
<tr>
<td>Changed for the better because of the injury</td>
<td>3</td>
</tr>
<tr>
<td>Same as before the injury</td>
<td>39</td>
</tr>
<tr>
<td>Changed for the worse because of the injury</td>
<td>58</td>
</tr>
<tr>
<td><strong>WORK TIME</strong></td>
<td></td>
</tr>
<tr>
<td>Worked full time since the injury</td>
<td>12</td>
</tr>
<tr>
<td>Worked most of the time since the injury</td>
<td>27</td>
</tr>
<tr>
<td>Worked little or not at all because of the injury</td>
<td>61</td>
</tr>
<tr>
<td><strong>&quot;FUN TIME&quot; PLEASURE</strong></td>
<td></td>
</tr>
<tr>
<td>Increased</td>
<td>6</td>
</tr>
<tr>
<td>Unchanged</td>
<td>25</td>
</tr>
<tr>
<td>Decreased</td>
<td>69</td>
</tr>
<tr>
<td><strong>CONTACT WITH OTHERS</strong></td>
<td></td>
</tr>
<tr>
<td>Increased</td>
<td>9</td>
</tr>
<tr>
<td>Unchanged</td>
<td>39</td>
</tr>
<tr>
<td>Decreased</td>
<td>52</td>
</tr>
<tr>
<td><strong>SIGNIFICANT OTHER RELATIONSHIPS</strong></td>
<td></td>
</tr>
<tr>
<td>Improved</td>
<td>25</td>
</tr>
<tr>
<td>Unchanged</td>
<td>54</td>
</tr>
<tr>
<td>Worsened</td>
<td>21</td>
</tr>
<tr>
<td><strong>FAMILY RELATIONSHIPS</strong></td>
<td></td>
</tr>
<tr>
<td>Improved</td>
<td>24</td>
</tr>
<tr>
<td>Unchanged</td>
<td>66</td>
</tr>
<tr>
<td>Worsened</td>
<td>10</td>
</tr>
<tr>
<td><strong>BODILY HEALTH</strong></td>
<td></td>
</tr>
<tr>
<td>Better</td>
<td>6</td>
</tr>
<tr>
<td>Same</td>
<td>22</td>
</tr>
<tr>
<td>Worse</td>
<td>72</td>
</tr>
<tr>
<td>Item</td>
<td>Frequency</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>EMOTIONAL HEALTH</td>
<td></td>
</tr>
<tr>
<td>Better</td>
<td>16</td>
</tr>
<tr>
<td>Same</td>
<td>41</td>
</tr>
<tr>
<td>Worse</td>
<td>44</td>
</tr>
<tr>
<td>ECONOMIC SITUATION</td>
<td></td>
</tr>
<tr>
<td>Better</td>
<td>9</td>
</tr>
<tr>
<td>Unchanged</td>
<td>33</td>
</tr>
<tr>
<td>Worse</td>
<td>58</td>
</tr>
<tr>
<td>RESPONSIBILITY FOR THE ACCIDENT</td>
<td></td>
</tr>
<tr>
<td>Myself</td>
<td>24</td>
</tr>
<tr>
<td>Others</td>
<td>45</td>
</tr>
<tr>
<td>No one special, accidental</td>
<td>31</td>
</tr>
<tr>
<td>OTHER PEOPLE KNOWN TO THE SUBJECT ALSO INJURED IN THE ACCIDENT</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>61</td>
</tr>
<tr>
<td>Yes, survived</td>
<td>33</td>
</tr>
<tr>
<td>Yes, died</td>
<td>6</td>
</tr>
<tr>
<td>EXPERIENCE AT MOMENT OF INJURY</td>
<td></td>
</tr>
<tr>
<td>Do not remember anything at the time of the injury</td>
<td>32</td>
</tr>
<tr>
<td>Did not think I would be seriously injured</td>
<td>39</td>
</tr>
<tr>
<td>Thought I would die</td>
<td>29</td>
</tr>
</tbody>
</table>
no change in their fun time and 6% (n=2) indicated their leisure/fun
time had improved.

Contact with Others, Significant
Other and Family Relationships

Fifty-two percent (n=17) indicated a decrease in contact with
others since the injury. Thirty-nine percent (n=13) noted no change
and 9% (n=3) had more contact with others. Relationships with signifi­
cant others remained unchanged since the injury for 54% (n=15). However,
21% (n=6) reported a less satisfying relationship with others while
25% (n=7) reported a more satisfying relationship. Family relation­
ships were unchanged for 66% (n=19), 10% (n=3) had a less satisfying
relationship and 24% (n=7) reported improved family relationships.
Overall, family and significant other relationships were unchanged
since the injury.

Health

Seventy-two percent (n=23) of the sample reported worse bodily
health since the injury, 6% (n=2) reported better health and 22% (n=7)
reported their health was the same as before the injury. Subjects
reported emotional health as either unchanged since the injury (41%,
n=13) or worse since the injury (44%, n=14). Sixteen percent (n=5)
reported improved emotional health.

Economic Situation

Fifty-eight percent (n=19) of the sample reported a worse
economic situation since the injury while 33% (n=11) reported it had
not changed. Nine percent (n=3) reported a better economic situation since the injury.

Implications of the Accident

The indication that others were responsible for the accident/injury accounted for 45% (n=13) of the subjects' responses. Fifty-five percent (n=16) of the sample either reported themselves as being responsible for the accident/injury (24%, n=7) or indicated the injury was "an accident" and was caused by "no one special" (31%, n=9). Sixty-one percent (n=20) of the subjects indicated no one they knew was injured in the accident. Thirty-nine percent (n=13) reported that someone they knew had been injured in the accident and either survived (33%, n=11) or died (6%, n=2). The item that assessed the subjects' perception of accident magnitude, "what did you experience at the moment of the injury?", had three responses: 1) do not remember anything at the time of the injury; 2) did not think I would be seriously injured; and 3) thought I would die. Only 29% (n=9) of the sample indicated they thought they would die. The remaining 71% did not remember anything at the time of the injury (n=10), or did not think they would be seriously injured (n=12). As one subject commented, "I just thought--this is gonna hurt".

MLEAIQ-I Data Summary

A majority of subjects reported changes for the worse in the following categories: occupation/work time, leisure time, contact with others, bodily/emotional health, and economic situation. Overall,
subjects blamed others for the accident. Subjects did not think they would be seriously injured at the moment of the accident.

The Modified Late Effects of Accidental Injury Questionnaire (MLEAIQ-II)

The MLEAIQ-II was used in this study to measure the incidence of PTSD symptomatology occurring within the past 30 days prior to when the subjects completed the questionnaire. Possible scores for the MLEAIQ-II ranged from 26 (low incidence of symptomatology) to 104 (high incidence of symptomatology). Subject score range was 33 to 98 with a mean of 66, SD 17.29. Reliability testing for the instrument yielded a Cronbach's alpha of .94, which indicated a high degree of internal consistency in the manner in which subjects responded to the questionnaire items. A varimax rotated factor analysis of the 26-item checklist was performed resulting in a 7-factor solution (eigenvalue 1.0 or above). Table 4 illustrates the factor groups as well as the frequency and mean of symptom report. The first factor was strongly suggestive of the avoidance symptomatology associated with PTSD. The second factor was reflective of symptoms of emotional stress. The third factor was consistent with somatic symptomatology. The fourth factor represented symptomatology associated with depression. The fifth factor described functional disability. Factors six and seven represented somatic complaints. Symptomatology from the MLEAIQ-II that reflected the diagnostic criteria for PTSD, established by the American Psychiatric Association (APA) was examined. Results relative to positive endorsement are illustrated in Table 5.
Table 4. Frequency and Mean of Positive Report and Factor Grouping of Symptoms

<table>
<thead>
<tr>
<th>Factor/Symptom</th>
<th>Mean (Range 1-4)</th>
<th>S.D.</th>
<th>% Endorsement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FACTOR 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trouble getting started during the day</td>
<td>2.9</td>
<td>1.1</td>
<td>88</td>
</tr>
<tr>
<td>Short of breath</td>
<td>1.8</td>
<td>1.2</td>
<td>43</td>
</tr>
<tr>
<td>Fear</td>
<td>1.9</td>
<td>1.15</td>
<td>52</td>
</tr>
<tr>
<td>Stress</td>
<td>2.7</td>
<td>1.18</td>
<td>79</td>
</tr>
<tr>
<td>Fear of situation similar to accident</td>
<td>2.5</td>
<td>1.2</td>
<td>70</td>
</tr>
<tr>
<td>Startled by sudden noises</td>
<td>2.1</td>
<td>1.08</td>
<td>64</td>
</tr>
<tr>
<td>Trouble remembering things</td>
<td>2.2</td>
<td>1.2</td>
<td>58</td>
</tr>
<tr>
<td>Trouble concentrating</td>
<td>2.3</td>
<td>1.15</td>
<td>64</td>
</tr>
<tr>
<td><strong>FACTOR 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headaches</td>
<td>2.5</td>
<td>1.12</td>
<td>73</td>
</tr>
<tr>
<td>Want to be alone</td>
<td>2.5</td>
<td>1.03</td>
<td>79</td>
</tr>
<tr>
<td>Nightmares</td>
<td>1.8</td>
<td>.972</td>
<td>52</td>
</tr>
<tr>
<td>Depression</td>
<td>2.3</td>
<td>1.3</td>
<td>64</td>
</tr>
<tr>
<td>Tension</td>
<td>2.9</td>
<td>.992</td>
<td>88</td>
</tr>
<tr>
<td><strong>FACTOR 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feel tired</td>
<td>3.21</td>
<td>1.05</td>
<td>91</td>
</tr>
<tr>
<td>Feel weak</td>
<td>2.8</td>
<td>1.09</td>
<td>85</td>
</tr>
<tr>
<td>Stomach problems</td>
<td>2.2</td>
<td>1.15</td>
<td>64</td>
</tr>
<tr>
<td>Bodily aches/pains</td>
<td>3.5</td>
<td>.80</td>
<td>94</td>
</tr>
<tr>
<td><strong>FACTOR 4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mood swings</td>
<td>2.8</td>
<td>.882</td>
<td>94</td>
</tr>
<tr>
<td>Restlessness during day/night</td>
<td>2.9</td>
<td>1.14</td>
<td>82</td>
</tr>
<tr>
<td>Sleeping problems</td>
<td>2.9</td>
<td>1.13</td>
<td>82</td>
</tr>
<tr>
<td>Bitterness</td>
<td>2.2</td>
<td>1.21</td>
<td>58</td>
</tr>
</tbody>
</table>
Table 4. Continued

<table>
<thead>
<tr>
<th>Factor/Symptom</th>
<th>Mean (Range 1-4)</th>
<th>S.D.</th>
<th>% Endorsement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FACTOR 5</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feel jumpy</td>
<td>2.4</td>
<td>1.14</td>
<td>76</td>
</tr>
<tr>
<td>Decreased work performance</td>
<td>3.1</td>
<td>1.13</td>
<td>82</td>
</tr>
<tr>
<td>Decreased physical performance</td>
<td>3.5</td>
<td>.972</td>
<td>94</td>
</tr>
<tr>
<td><strong>FACTOR 6</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweating</td>
<td>2.1</td>
<td>1.13</td>
<td>61</td>
</tr>
<tr>
<td><strong>FACTOR 7</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dizziness</td>
<td>1.8</td>
<td>.960</td>
<td>49</td>
</tr>
</tbody>
</table>
Table 5. Mean and Positive Endorsement of Modified Late Effects of Accidental Injury Questionnaire Part II (MLEAIQ-II) Symptomatology Analogous With the American Psychiatric Association (APA) Diagnostic Criteria for Post-Traumatic Stress Disorder (PTSD)

<table>
<thead>
<tr>
<th>APA Diagnostic Criteria for PTSD</th>
<th>Mean (Range 1-4)</th>
<th>S.D.</th>
<th>% Endorsement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INCREASED AROUSAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Startled by abrupt, sharp or sudden noises</td>
<td>2 1</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Trouble concentrating</td>
<td>2.3 1</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Mood swings</td>
<td>3 1</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>Restlessness during the day/night</td>
<td>3 1</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>Sleeping problems</td>
<td>3 1</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>Feel jumpy</td>
<td>2.4 1.14</td>
<td>76</td>
<td></td>
</tr>
<tr>
<td>Sweating</td>
<td>2.1 1.13</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>Tension</td>
<td>2.9 .992</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td><strong>PERSISTENT AVOIDANCE OF STIMULI ASSOCIATED WITH THE TRAUMA OR NUMBING OF GENERAL RESPONSIVENESS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of a situation similar to that in which the accident/injury took place</td>
<td>2.5 1</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Want to be alone</td>
<td>2.5 1</td>
<td>79</td>
<td></td>
</tr>
</tbody>
</table>
Revised Impact of Event Scale (RIES)

The RIES was used in this study to measure the frequency of PTSD symptomatology as defined by frequency of avoidance and intrusion experiences that occurred 30 days prior to when subjects completed the questionnaire. Internal consistency of the subscales was calculated using Cronbach's alpha and was .80 for the intrusion subscale and .80 for the avoidance subscale. Possible scores for the RIES ranged from 0 to 75. Horowitz (1982) reported that the level of distress with the RIES was considered to be low for a score of 0 - 8, medium for a score of 9 - 19 and high for a score of 20 or above. Subject score range was 0 to 66 with a mean score of 22, SD 18. Reliability testing of the instrument yielded a Cronbach's alpha of .90 which indicated subjects responded to the items in a consistent manner. Instrument response data is summarized in Table 6.

Table 7 presents the mean values for the avoidance and intrusion subscales of the RIES as well as overall mean scores. Also illustrated are the values for those subjects (n=66) diagnosed with stress response syndromes in the study done by Horowitz (1979).

Research Questions

1. Is there a statistically significant relationship between severity of injury and the level of PTSD symptomatology? There was no statistically significant relationship between severity of injury and PTSD symptomatology as demonstrated by the results of testing hypotheses two and three.
Table 6. Revised Impact of Event Scale (RIES): Frequency and Mean of Positive Report

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean (Values=0,1,3,5)</th>
<th>S.D.</th>
<th>% Endorsement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRUSION ITEMS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I had waves of strong feelings about the accident.</td>
<td>2.3</td>
<td>1.2</td>
<td>61</td>
</tr>
<tr>
<td>Other things kept making me think about the accident.</td>
<td>2.3</td>
<td>1.19</td>
<td>67</td>
</tr>
<tr>
<td>I thought about the accident when I didn't mean to.</td>
<td>2.2</td>
<td>1.23</td>
<td>64</td>
</tr>
<tr>
<td>Pictures about the accident popped into my mind.</td>
<td>2.2</td>
<td>1.2</td>
<td>64</td>
</tr>
<tr>
<td>Any reminder brought back feelings about the accident.</td>
<td>2.1</td>
<td>1.13</td>
<td>61</td>
</tr>
<tr>
<td>I had trouble falling asleep or staying asleep because of pictures or thoughts about the accident that came into my mind.</td>
<td>1.90</td>
<td>1.12</td>
<td>49</td>
</tr>
<tr>
<td>I had dreams about the accident.</td>
<td>1.75</td>
<td>1.09</td>
<td>40</td>
</tr>
<tr>
<td><strong>AVOIDANCE ITEMS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I was aware that I still had a lot of feelings about the accident but I didn't deal with them.</td>
<td>1.8</td>
<td>1.07</td>
<td>42</td>
</tr>
<tr>
<td>I avoided letting myself get upset when I thought about the accident or was reminded of it.</td>
<td>2.5</td>
<td>1.17</td>
<td>73</td>
</tr>
<tr>
<td>I tried to remove the accident from memory.</td>
<td>1.66</td>
<td>1.16</td>
<td>30</td>
</tr>
<tr>
<td>I tried not to talk about the accident.</td>
<td>1.6</td>
<td>1.05</td>
<td>30</td>
</tr>
<tr>
<td>My feelings about the accident were kind of numb.</td>
<td>1.8</td>
<td>1.23</td>
<td>36</td>
</tr>
<tr>
<td>I felt as if the accident hadn't happened or it wasn't real.</td>
<td>1.6</td>
<td>1.05</td>
<td>30</td>
</tr>
<tr>
<td>I stayed away from reminders of the accident.</td>
<td>1.69</td>
<td>.984</td>
<td>40</td>
</tr>
<tr>
<td>I tried not to think about the accident.</td>
<td>1.87</td>
<td>1.21</td>
<td>43</td>
</tr>
</tbody>
</table>
Table 7. Comparison of Mean Values for the Revised Impact of Event Scale (RIES)

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRUSION SUBSCALE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Traumatically injured subjects</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>**Stress response syndrome subjects</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td><strong>AVOIDANCE SUBSCALE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Traumatically injured subjects</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>**Stress response syndrome subjects</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td><strong>TOTAL SCALE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Traumatically injured subjects</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>**Stress response syndrome subjects</td>
<td>40</td>
<td>17</td>
</tr>
</tbody>
</table>

*Current Study  
**Horowitz (1979)
2. Is there a statistically significant relationship between length of hospital stay and the level of PTSD symptomatology? There was no statistically significant relationship between length of hospital stay and PTSD symptomatology as demonstrated by the results of testing hypotheses five and six.

3. Is there a statistically significant relationship between subject reported late negative effects from the traumatic injury and PTSD symptomatology? There was no statistically significant relationship between subject reported late negative effects from the traumatic injury and PTSD symptomatology as demonstrated by the results of testing hypotheses seven and eight.

**Hypotheses Testing**

The following null hypotheses were tested at the alpha = .05 level of significance:

**H0-1.** There will be no statistically significant relationship between the severity of injury and the level of subject reported negative late effects from a traumatic injury (MLEAIQ-I). Table 8 presents these data. There was no statistically significant relationship between the severity of injury and the level of subject reported negative late effects from a traumatic injury. Thus, the null hypothesis was accepted.

**H0-2.** There will be no statistically significant relationship between the severity of injury and the level of PTSD symptomatology assessed by a 26-item symptom checklist (MLEAIQ-II). Table 9 presents these data. There was no statistically significant relationship between
Table 8. Pearson Product-Moment Correlations Between Injury Severity Score (ISS), Length of Hospital Stay (LOS) and the Modified Late Effects of Accidental Injury Part I (MLEAIQ-I)

<table>
<thead>
<tr>
<th>Variables</th>
<th>MLEAIQ-I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury Severity Score (ISS)</td>
<td>( r = -0.1893 )</td>
</tr>
<tr>
<td>Length of Hospital Stay (LOS)</td>
<td>( r = 0.1499 )</td>
</tr>
</tbody>
</table>

\( p = > 0.05 \)
Table 9. Pearson Product-Moment Correlations Between Injury Severity Score (ISS), Length of Hospital Stay (LOS), Subject Reported Late Negative Effects From a Traumatic Injury (MLEAIQ-I) and Measures of Post-Traumatic Stress Disorder (PTSD) Symptomatology

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measures of PTSD Symptomatology</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MLEAIQ-II</td>
<td>RIES</td>
<td></td>
</tr>
<tr>
<td>Injury Severity Score (ISS)</td>
<td>r = .0384</td>
<td>r = .0470</td>
<td></td>
</tr>
<tr>
<td>Length of Hospital Stay (LOS)</td>
<td>r = .2150</td>
<td>r = .0849</td>
<td></td>
</tr>
<tr>
<td>Subject reported late negative effects from a traumatic injury (MLEAIQ-I)</td>
<td>r = .3543</td>
<td>r = -.0012</td>
<td></td>
</tr>
</tbody>
</table>

p > 0.05
the severity of injury and the level of PTSD symptomatology assessed by the MLEAIQ-II. Therefore, the null hypothesis was accepted.

**HO-3.** There will be no statistically significant relationship between the severity of injury and the level of PTSD symptomatology assessed by the impact of the event (RIES). Table 9 presents these data. There was no statistically significant relationship between the severity of injury and the level of PTSD symptomatology assessed by the RIES. The null hypothesis was accepted.

**HO-4.** There will be no statistically significant relationship between length of hospital stay and the level of subject reported negative late effects from a traumatic injury (MLEAIQ-I). Table 8 presents these data. There was no statistically significant relationship between the length of hospital stay and the level of subject reported negative late effects from a traumatic injury. Thus, the null hypothesis was accepted.

**HO-5.** There will be no statistically significant relationship between length of hospital stay and the level of PTSD symptomatology assessed by the 26-item symptom checklist (MLEAIQ-II). Table 9 presents these data. There was no statistically significant correlation between length of hospital stay and the level of PTSD symptomatology assessed by the MLEAIQ-II. Thus, the null hypothesis was accepted.

**HO-6.** There will be no statistically significant relationship between length of hospital stay and the level of PTSD symptomatology assessed by the impact of the event (RIES). Table 9 presents these data. There was no statistically significant correlation between length
of hospital stay and the level of PTSD symptomatology assessed by the impact of the event. Thus, the null hypothesis was accepted.

**(HO-7)** There will be no statistically significant relationship between subject reported late negative effects of a traumatic injury (MLEAIQ-I) and the level of PTSD symptomatology assessed by the 26-item symptom checklist (MLEAIQ-II). Table 9 presents these data. There was no statistically significant correlation between subject reported late negative effects of a traumatic injury and the level of PTSD symptomatology assessed by the MLEAIQ-II. Thus, the null hypothesis was accepted.

**(HO-8)** There will be no statistically significant relationship between subject reported late negative effects of a traumatic injury (MLEAIQ-I) and the level of PTSD symptomatology assessed by the impact of the event (RIES). Table 9 illustrates these data. There was no statistically significant correlation between subject reported late negative effects of a traumatic injury and the level of PTSD symptomatology assessed by the impact of the event. Thus, the null hypothesis was accepted.

**Other Findings**

The item on the demographic questionnaire, "Have you had any major life upsets within the past year?" assessed subject reported disturbing life events other than the traumatic injury. For an informal content analysis, subjects were divided into two groups: Group 1 (n=16) consisted of those subjects who reported major life upsets and Group 2 (n=17) included those subjects who indicated no other major life
upsets. The mean scores for both measures of PTSD symptomatology for Group 1 (MLEAIQ-II, $\bar{x} = 73$; RIES, $\bar{x} = 30$) were higher than the mean scores for Group 2 (MLEAIQ-II, $\bar{x} = 63$; RIES, $\bar{x} = 17$).

Late responses to a traumatic injury were examined. The data indicated that there was no statistically significant relationship between ISS and PTSD symptomatology (MLEAIQ-II; $r = .0384$, $p = .83$, RIES; $r = .0470$, $p = .80$) or LOS and PTSD symptomatology (MLEAIQ-II; $r = .215$, $p = .23$, RIES; $r = .085$, $p = .64$). In addition, no statistically significant relationship was found between subject reported late negative effects and PTSD symptomatology (MLEAIQ-II; $r = .35$, $p = .11$; RIES; $r = -.0012$, $p = .99$).

**Summary**

Findings indicated no statistically significant relationship between the severity of injury, length of hospital stay and any negative late effects from the traumatic injury with the development of PTSD symptomatology.

Overall, the incidence of PTSD symptomatology in the subjects was moderate to high as indicated by mean scores on the RIES and the MLEAIQ-II.
CHAPTER V

DISCUSSION AND CONCLUSIONS

A discussion of the findings that were generated when hypothesized relationships between specific variables were tested is presented in this Chapter. Recommendations for further research and the implications for nursing are also presented.

"My whole attitude has changed. I realize now how quickly a life can be terminated...I was given a second chance to change myself."

—Subject Comment

Background and Purpose of the Research

This study was based on a theoretical framework which linked the physiological model of inescapable shock (IS) with the behavioral alterations seen in PTSD. The framework was supported by the literature which indicated:

1. A physiological basis for several of the behavioral alterations seen in PTSD such as the state of hyperarousal as well as avoidance and intrusion experiences.

2. Protective variables such as extended hospitalization post-injury may play an important role in reducing stressors, thereby modulating or preventing PTSD after exposure to a traumatic injury.

Post-traumatic stress disorder (PTSD) has been investigated in various populations, most commonly with a population of combat
veterans. The purpose of the current study was to determine the relationship between non-combat traumatic injury and the occurrence of PTSD symptomatology.

The sample consisted of 33 traumatically injured adults. Subjects were recruited from two large level III trauma centers in the southwestern United States. Subjects completed a questionnaire packet containing a demographic data form and three instruments that focused on negative effects from a traumatic injury and PTSD symptomatology.

Discussion

The independent variables: length of hospital stay (LOS); severity of injury (ISS); and subject reported late negative effects from a traumatic injury (MLEAIQ-I); will be discussed as well as the dependent variable (PTSD symptomatology) as assessed by the RIES and MLEAIQ-II.

PTSD Symptomatology

PTSD is a clinical entity described by a group of symptoms delineated in the American Psychiatric Association's DSM-III-R, 1987 edition. Long-term stress responses to catastrophically stressful events have been investigated extensively (Figley, 1985). However, for a stress response to become pathologic, as with PTSD, the response must be prolonged to such an extent that it interferes with the individual's ability to function (Figley, 1985).

Kuch, Swinson and Kirby (1985) described phobias related to being in cars in 77% of their sample (n=30) of survivors of car crashes. Fifty-three percent of their sample responded with increased anxiety
(measured empirically) to imagined exposure to the accident scene. Indeed, in the present study, one subject commented, "I always fear getting into a car accident or taking a curve scares the daylights out of me...I don't drive fast and I will probably be like this for quite sometime". Another commented, "most (traffic) intersections cause me to think about the accident", "I tried to avoid it (accident scene) whenever possible before, but am not that sensitive anymore, even though I have some visions of the accident then". Efforts to avoid activities or situations that arouse recollections of the trauma is one of the diagnostic criteria for PTSD (American Psychiatric Association, 1987). PTSD symptomatology in this study was measured by the MLEAIQ-II and the RIES. Those symptoms on the MLEAIQ-II that paralleled the DSM-III-R diagnostic criteria for PTSD were endorsed as either occurring rarely, sometimes or often by greater than 60% of the subjects. However, as Malt (1989) cautioned, the endorsements do not differentiate between patients with injury-related post-traumatic problems and patients with psychopathology not related to the injury.

Malt, et al. (1989) reported that selection of the item, "tendency to isolate myself from others", was the single best predictor of the presence of psychopathology. In the present study, "tendency to isolate myself from others" was changed to "want to be alone" for clarification. Seventy-nine percent (n=26) of the sample endorsed this item. On the MLEAIQ-I the item, "compared with before the injury, contact with others has been decreased" was endorsed by 52% (n=17) of the subjects. Whether the decreased contact with others was a result
of the medley of physical aberrations expressed by the subjects or whether it is a true avoidance phenomenon consistent with PTSD was not determined.

Horowitz (1982) reported that the level of distress with the RIES was considered to be low for a score of 0-8, medium for 9-19 and high for 20 or above. Malt (1988) concluded that the low RIES scores reported in his study supported the low incidence of PTSD in the studied subjects. Surprisingly in the present study, 83% of the sample scored at the medium (n=12) to high level (n=13) of distress on the RIES, while only 17% (n=5) scored at the low level of distress. Of the three people indicating the need for psychological help, all three scored in the "high" level of distress on the RIES (scores = 41, 42, 64). These subjects were requested by letter to contact their primary health care provider for assistance. The item on the RIES that was most frequently endorsed (n=24), "I avoided letting myself get upset when I thought about the accident or was reminded of it", represented an avoidance response characterized by behavioral inhibition. Horowitz, et al. (1979) reported that avoidance responses included "denial of the meanings and consequences of the event, ideational constriction, behavioral inhibition and awareness of emotional numbness" (p. 210).

The next three most frequently endorsed items represented intrusion experiences; "other things kept making me think about the accident" (n=22), "pictures about the accident popped into my mind" (n=21), and "I thought about the accident when I didn't mean to" (n=21). These items supported one tenet of the animal model of inescapable shock (IS), that is; the traumatic event is consolidated pathophysiologically
in the memory such that any stressful event can act as a "trigger" and reaccess the memory of the traumatic event. As Pitman (1988) postulated, the traumatic memory is stored as a learned response so that once triggered, the stimulus, meaning, and response patterns (i.e., physiological as well as behavioral response patterns) that were active at the time of the event are reactivated. This phenomenon could conceivably provide a physiological basis for the behavioral stress response symptomatology (i.e., "feel jumpy", "startled by abrupt, sharp or sudden noises") reported by the majority of subjects in the current study.

The present study attempted to investigate concrete variables associated with the development of PTSD symptomatology in a traumatically injured population. Findings are compared with other research studies in an effort to enhance the growing compendium on the psychological sequelae of traumatic injury.

Length of Hospital Stay

Findings in this study did not support the hypothesis that the hospital represents a "cosseted" environment (Curran, et al., 1990) which effectively delays the onset of any psychopathology until post-hospital discharge. Inherent in this hypothesis is the premise that the hospital offers a less stressful environment to the patient thereby preventing the chronic pathological memory retrieval of the traumatic injury. Length of hospital stay was not predictive of either the development of PTSD symptomatology or a decrease in subject reported late negative effects from a traumatic injury. This finding is not
surprising in light of the fact that greater than 50% of the sample did not view the hospital environment as particularly "cossetting". Subject complaints ranged from "staff insensitivity" to "lack of communication between the physician and myself". Also, the small mean number of days subjects spent in the hospital (\( \bar{x} = 9 \)) contrasts markedly with a previous study (Tucker, 1987) wherein length of hospital stay was between 45-78 days. Tucker (1987) reported those patients remaining in the hospital longer either did not develop PTSD or developed a form of delayed onset PTSD one year post-hospital discharge. Curran, et al. (1990) hypothesized the positive effect of a "cossetted" hospital environment secondary to discovering delayed onset PTSD in two patients who had severe physical injuries (ISS=19), requiring an extended hospital stay (length of hospital stay was not reported). These two patients developed PTSD some time between 6-12 months post-injury with the diagnosis made at the 12 month mark. In the present study, the mean time since the traumatic injury to the date when subjects completed the questionnaires for the more severely injured subjects (ISS=20-22) was only nine months. Therefore, it is conceivable that the "window" for the more severely injured subjects developing PTSD might have been excluded in the present study. Interestingly, there was no particular association between a subject's ISS and the length of hospital stay (Figure 3). Those subjects with an ISS of 9, 12 and 13 (moderate injury) were hospitalized as long or longer than those subjects with an ISS of 22 (severe injury). These findings, coupled with the finding that 55% (n=18) of the subjects reported deficiencies in the medical
Figure 3. Comparison of Subject Injury Severity Score (ISS) and Length of Hospital Stay (LOS)
treatment they received, might explain why there was no correlation between length of stay and reported PTSD symptomatology.

An informal content analysis of those questionnaires wherein the subject indicated they had been hospitalized again since the injury showed no decrease in subject report of negative late effects or PTSD symptomatology.

Subject Reported Late Negative Effects From a Traumatic Injury

Findings in this study did not support the hypothesis that a higher incidence of subject reported negative effects was predictive of PTSD symptomatology. Malt, et al. (1989) reported similar results which were attributed to the low prevalence of major negative late effects that subjects reported. Such was not the case in the present study in which 50% of the 12 items on the MLEAIQ-I were endorsed as a negative late effect from a traumatic injury by 50% or greater of the subjects.

An interesting difference between the two studies was the dissimilarity in reported economic situation as a result of the traumatic injury. Malt, et al. (1989) reported only 9.3% of their sample indicated a worse economic situation while in the present study 58% (n=19) of the sample reported a worse economic situation as a result of the injury. Malt, et al. (1989) attributed the low percentage to a well-developed Norwegian social security system that "covers practically all expenses associated with the care of accidental injuries and... provides permanent disability pension if needed" (p. 91). In the current study, reports of economic disability were prevalent; "unable to work,
had trouble with the insurance companies, had to take out a loan", "everything has gone to sh—, now the wife has to carry the full load on one third the income", and "my world has been upended...I'm unable to continue with my career...we went from a two income family to a one income family".

As with the 1989 study done by Malt, et al., the most frequently reported negative outcome in the present study was permanent physical changes followed by reduced physical function then worse bodily health. Of those subjects in the current study who indicated the need for further medical help, 76% (n=14) of those were requests for help with continuing physical problems; "I would like to know what to expect in the future regarding (the) broken clavicle not set right", "stop the pain from hard exercise", "what to do to...get physical strength back", "still having trouble with my shoulders", and "(would like) physical therapy until back to the way I was before the accident". These subjects were requested by letter to contact their primary health care provider for assistance.

In the current study, the fourth most frequently reported late negative effect from a traumatic injury was decreased pleasure from "fun" time (69%, n=22). Of those reporting decreased "fun" time pleasure, 96% (n=21) also reported decreased physical function as a result of the injury. Subject comments, along with time since the injury, included; "I walk weird, and with pain" (16 months since injury), "cannot run, harder to walk around, limited balance - cannot lift anything" (four months since injury), "I can't walk normally" (six months since injury), and "slowed me down in a variety of activities which I used to do" (four months since injury). Not surprisingly,
Malt, et al. (1989) reported a modest correlation between "physical changes" and "pleasure in 'fun' activities" ($r = .348$, significance level was not reported) which the trend in the current study would seem to support. Also in the study done by Malt, et al. (1989), "psychological health" correlated most strongly with "bodily health" ($r = .498$, significance level was not reported), followed by "pleasure in leisure activities" ($r = .465$, significance level was not reported). Those subjects in the current study who reported both decreased pleasure from "fun" time and worse bodily health, 60% ($n=9$) also reported worse emotional health because of the injury. Conclusively, these findings from both studies indicate that the outcomes, "worsened bodily health", "reduced pleasure from 'fun' time" and "worsened emotional/psychological health" were often reported simultaneously. It would be logical to conclude that the subject's reported worse bodily health led to a reduced pleasure from "fun" time and that both variables impacted on the subjects' emotional/psychological health, even though this conclusion was not supported statistically.

Perhaps the most poignant illustrations of the impact of the injury were provided by the subjects themselves. Pain was one negative outcome the subjects discussed, "over and over with every agonizing beat of your heart you relive the accident...you can never have the life you've had before because you can't stop the pain!", "I'm tired of hurting, of being in pain". A sense of the loss of self was very prominent, "I feel there is something I should be doing with my life that I am going to miss out on by my inactivity...I occasionally have unexplainable feelings of imminent doom", and "I feel I've lost a lot since the accident, especially the senses of independence and
Many of the subjects expressed anger at the reduction in physical activity caused by the injury, "I get really mad when I think about the accident...I was very active in sports and can no longer participate in them", "being an avid bicycle rider...it has been very difficult to be sedentary for three months. I deeply resent losing my fitness". Hopelessness and depression were expressed, "steadily downhill both mental and physical. Depression...discomfort", "sometimes I still feel defeated and depressed", and "after...months in (rehabilitation) no hope for improvement". Two subjects reported someone they knew died in the accident. One subject expressed their sense of loss, "it really hurts so bad when you lose someone who you spent most of your life with. My wife was very special to me, I loved her dearly".

Injury Severity Score

Ursano (1989) emphasized the quantity of a stressor as opposed to the quality of a stressor as being predictive of PTSD symptomatology. In the present study, ISS was not correlated with either PTSD symptomatology or subject reported negative outcomes. The negative correlation ($r = -.1893$) between ISS and subject reported late negative effects (as measured by the MLEAIQ-I) indicated that the more severely injured subjects reported less negative effects from the traumatic injury. Although this would seem paradoxical, often the more critically injured subjects repress or deny any negative outcomes from a severe injury (C. Bluth, personal communication, September 13, 1991). Other studies have used an ISS to describe the subject sample, (Malt, 1988; Malt, Blikra & Hoivik, 1989; Malt, Myhrer, Blikra & Hoivik, 1987 & Curran,
et al., 1990), but in only one study (Curran, et al., 1990) did the investigators attempt to correlate the ISS with subject psychological outcome. In the study done by Curran, et al. (1990) that investigated the psychological consequences of a bombing, the researchers reported no significant correlation between physical and psychological injury. In fact, of the subject population exhibiting PTSD six months post-injury, the mean ISS score was a mere 1.2 (Curran, et al., 1990). However, at the 12 month assessment mark, the investigators reported that two subjects who "suffered severe physical injuries" (ISS=19, p. 480) had developed PTSD. Another study, Tucker (1987), supported the conclusion that more severely injured patients can exhibit a delayed onset PTSD that is not diagnosed until 12 months or later after the original injury. Whether this is from the "cossetted" hospital environment posited by Curran, et al. (1990), or other variables, is undetermined. It is likely in the current study that two variables contributed to the non-correlation between ISS and PTSD symptomatology; 1) the small number of severely injured subjects (n=2) with an ISS of 20-22 who were 12 months or greater post-injury at the time they completed the questionnaires; and 2) the small number of frequencies for each ISS value. Malt (1988) concluded the "quantity" of stressor inherent in motor vehicle accidents was insufficient to provoke PTSD. However, while Malt (1988) examined the subjects at three different points in time (in-hospital, six to nine months post-injury and 16-51 months post-injury), the mean subject ISS reported (m=8.6, SD = 4.9) was significantly lower than both the ISS scores (ISS=19) of the two subjects reported by Curran, et al. (1990) who developed PTSD at
12 months post-injury and the mean ISS scores for subjects in the present study (m=14, SD = 4.67). In the present study, in which greater than 90% of the injuries were caused by motor vehicle accidents, greater than 60% of the subjects indicated symptomatology consistent with the PTSD diagnostic criteria defined by the American Psychiatric Association's DSM-III-R, 1987.

The animal model of inescapable shock (IS) hypothesized that it is the lack of control the animal has in terminating the shock that provokes the physiological chaos leading to PTSD (Van der Kolk, et al., 1985). In humans then, the subject must perceive the event as "inescapable". In the present study, 71% (n=22) of the subjects did not perceive the accident to be life-threatening or "inescapable". Therefore, if the magnitude of the stressor in this study may not have been sufficient to provoke PTSD symptomatology, then what variable caused the moderate to high level of frequency of PTSD symptomatology reported? Three variables may have been the culprits. First, it is likely that the item, "what did you experience at the moment of injury?" is not a reliable quantifier of the actual magnitude of an accident but merely served as an assessment of the subject's retrospective perception of the event. Secondly, 45% of the subjects (n=13) in the current study blamed others for the traumatic injury. Krupnick and Horowitz (1981) reported that a content analysis of major themes occurring during psychotherapy sessions with victims of personal injury showed that rage at the source of trauma occurred very often. Consequently, Keiser (1968) reported the importance of blaming others for the accident as a predictor of negative long-term outcome. Finally,
it is conceivable that the "inescapable shock" in humans occurs over a period of time rather than at the moment of injury. When one realizes the impact of traumatic injury on physical ability, work, economic situation, etc., the reality of the injury becomes "inescapable". This cognitive process is what separates man from animal (L. Crosby, personal communication, September 13, 1991).

Other Findings

The difference in mean scores on both measures of PTSD symptomatology between Group 1, who reported major life upsets, and Group 2, who reported no other major life upsets, is an interesting finding. This trend lend credence to the reports by both Kolb (1989) and Horowitz (1986) that stated prior life stress predisposed an individual to developing symptomatology consistent with PTSD. Also, as hypothesized by the IS model, the more stressors experienced by the subject subsequent to the initial traumatic injury, the more the memory of the traumatic event would be "triggered" thereby provoking the behavioral and physiological cascade associated with PTSD. This phenomenon would certainly seem to be supported by the difference in group mean scores on the MLEAIQ-II and the RIES.

Conclusions

1. The results of this study indicated that there was a clinically significant occurrence of PTSD symptomatology in the traumatically injured population examined.
2. The findings of this study have indicated a change in life patterns following a traumatic injury, i.e., physical disability, social isolation and economic devastation.

3. The animal model of inescapable shock (IS) provided a theoretical basis for the behavioral and physiological symptomatology consistent with PTSD that was reported by subjects in this study. For example, the frequent endorsement of behavioral symptomatology such as "startled by abrupt, sharp or sudden noises", "feel jumpy", and "mood swings" was supported by the hyperarousal state postulated by the IS model. Measurement of the physiological parameters of the animal model of inescapable shock (IS) could not be evaluated as they were beyond the scope of this study.

4. Reliability for both the Revised Impact of Event Scale (RIES) and the Modified Late Effects of Accidental Injury Questionnaire checklist (MLEAIQ-II) was demonstrated.

**Recommendations**

Areas for further investigation were developed. The recommendations include:

1. Replication of the study with a larger sample.
2. Utilization of multiple geographical settings in trauma centers across the country.
3. Recruitment of more subjects injured in violent crimes (i.e., shootings, stabbings).
5. Replication of the study utilizing a longitudinal design.
6. Use of psychiatric clinical interviews with subjects to validate those instruments assessing PTSD symptomatology.
7. Addition of measures that assess subject's perception of the traumatic event.
8. Control for variables such as subject perception of health care received while hospitalized and any major upsets occurring after the traumatic injury that would conceivably impact subjects' responses.
9. Addition of physiological measures of stress such as blood pressure, heart rate, urinary cortisol and urinary norepinephrine.
10. Control for subject pre-morbid status by utilizing matched controls.
11. Utilization or development of reliable and valid scales to quantify PTSD.

Implications for Nursing

In a multi-billion dollar industry that prides itself on caring, it is inconceivable that patients would still comment on the lack of an opportunity to talk about fear, anxiety and other feelings after a traumatic injury. Nurses can impact on many of the negative outcomes of a traumatic injury such as fear, depression and hopelessness by discussing these feelings with the patient at the earliest possible
moment. Several investigators have reported the need for immediacy in recognition and intervention to prevent PTSD (Ramsay, 1990; Mejo, 1990). Nurses, as 24 hour primary caregivers, are in an ideal position to encourage patients to verbalize their fears. Self-help groups for trauma patients can be formed within the hospital to function in a way similar to the "rap" groups formed by Viet Nam veterans in an effort to allay fears through camaraderie (Silverman, 1986). Nurses who help traumatically injured patients "cope by forgetting" (Penk & Robinowitz, 1987, p. 5) are doing a grave disservice to trauma patients who, as demonstrated by the results of this study, are at risk for developing symptomatology consistent with PTSD. The results of this study indicated that traumatic injury is a chronic disease in terms of its debilitating long-term negative outcomes. Therefore, it is imperative that nurses are aware of the long-term negative outcomes associated with traumatic injury. Nurses are in a position to mobilize social resources to diminish the economic impact of traumatic injury. Physical disability can be lessened by early patient enrollment in rehabilitation programs. Even while in intensive care units, simple range of motion exercises can ensure muscles remain supple to maximize later rehabilitation efforts.

The animal model of inescapable shock (IS) utilized in this study provided a framework, based on physiological rationale, for understanding PTSD symptomatology. Nurses caring for traumatically injured patients can extrapolate from the IS model to formulate nursing interventions designed to decrease the psychological impact of a traumatic injury. For example, the IS model postulated that stressors
can "trigger" the memory of the traumatic event which then evoked a plethora of pathophysiological responses. Nurses can function as gatekeepers in modulating the extraneous stressors that confront patients in the hospital. A decrease in the amount of post-injury stressors may conceivably alleviate the physiological hyper-reactivity inherent with PTSD thereby impacting on the patients course of recovery.

Perhaps the single most important intervention a nurse can do with a traumatically injured patient is listen. Traumatically injured patients have stepped beyond the realm of normal human experience and, as such, they need to reaffirm their life force. Too often with traumatic injuries, the mind is left behind in the effort to save the body. Nursing's emphasis on holism should guarantee that a modicum of compassion incises through the high-tech health care wizardry to insure the integration of a person's psychological self with the biologic self such that a viable, psychologically intact individual is returned to society.

Nursing must incorporate the concept of stress response syndromes such as PTSD in order to keep pace with the dizzying acceleration of societal violence. A nursing paradigm for PTSD research must be developed that circumscribes prevention, assessment and intervention. Only then can nurses act as driving forces to impact upon the final outcome for traumatically injured patients.
APPENDIX A

THE MODIFIED LATE EFFECTS OF ACCIDENTAL INJURY QUESTIONNAIRE (MLEAIQ-I) (PART I)
The Modified Late Effects of Accidental Injury Questionnaire
(Part I)

Below you will find questions about the accident and the effect the injury has had for you. Read each question carefully. Place a check beside the answer you think fits you best. It is important that you answer all the questions. If there is something you think is important or believe would help others which is not covered in the questions, please add.

Question 1

Is your work/occupation today: (check one)

____ changed for the better because of the injury
____ the same as before the injury
____ changed for the worse because of the injury

Question 2

How much have you worked since the injury as compared to before the injury? (this includes housework, schoolwork or at your job). (check one)

____ worked full time since the injury
____ worked most of the time since the injury
____ worked little or not at all because of the injury

Question 3

What pleasure do you have from your "fun" time since the injury in comparison to before the injury? (check one)

____ increased pleasure
____ unchanged
____ decreased pleasure

Question 4

Compared with before the injury, has your contact with others been: (check one)

____ increased
____ unchanged
____ decreased
Question 5

How has your relationship with your wife/husband/person you live with been since the injury compared with before the injury? (check one)

___ improved
___ unchanged
___ worsened

Question 6

How has your relationship with other family members been since the injury compared to before the injury? (check one)

___ improved
___ unchanged
___ worsened

Question 7

On the whole, how do you think your bodily health has been since the injury as compared to before the injury? (check one)

___ better
___ the same
___ worse

Question 8

On the whole, how do you think your emotional health has been since the injury as compared to before the injury? (check one)

___ better
___ the same
___ worse

Question 9

How is your economic situation today compared with before the injury? (check one)

___ better
___ unchanged
___ worse
Question 10

Who do you consider was responsible for the accident/injury? (check one)
   ___ myself
   ___ others
   ___ no one special, accidental

Question 11

Was anyone you knew injured at the same time as you in the accident? (check one)
   ___ no
   ___ yes, survived
   ___ yes, died

Question 12

What did you experience at the moment of the injury? (check one)
   ___ do not remember anything at the time of the injury
   ___ did not think I would be seriously injured
   ___ thought I would die
APPENDIX B

THE MODIFIED LATE EFFECTS OF ACCIDENTAL INJURY QUESTIONNAIRE (MLEAIQ-II) (PART II)
Subject number ——_

The Modified Late Effects of Accidental Injury Questionnaire  
(Part II)

For each item, place a check mark indicating how frequently these complaints were true for you during the PAST MONTH. If they did not occur at all during that time, check the “not at all” column.

<table>
<thead>
<tr>
<th>Complaint</th>
<th>NOT AT ALL</th>
<th>RARELY</th>
<th>SOMETIMES</th>
<th>OFTEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>feel tired</td>
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<td></td>
<td></td>
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<tr>
<td>feel jumpy</td>
<td></td>
<td></td>
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<tr>
<td>trouble getting started during the day</td>
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<tr>
<td>mood swings</td>
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<td></td>
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<tr>
<td>decreased work performance</td>
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<tr>
<td>decreased physical performance</td>
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<tr>
<td>feel weak</td>
<td></td>
<td></td>
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<tr>
<td>dizziness</td>
<td></td>
<td></td>
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<tr>
<td>sweating</td>
<td></td>
<td></td>
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<tr>
<td>stomach problems</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>short of breath</td>
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<tr>
<td>bodily aches/pains</td>
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<tr>
<td>headaches</td>
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<tr>
<td>want to be alone</td>
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<td></td>
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<tr>
<td>nightmares</td>
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<tr>
<td>restlessness during the day and night</td>
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<tr>
<td>sleeping problems</td>
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<tr>
<td>fear</td>
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<tr>
<td>stress</td>
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<tr>
<td>tension</td>
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<tr>
<td>fear of a situation similar to that in which the accident/injury took place</td>
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<tr>
<td>startled by abrupt, sharp or sudden noises</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>trouble remembering things</td>
<td></td>
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<tr>
<td>trouble concentrating</td>
<td></td>
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<tr>
<td>depression</td>
<td></td>
<td></td>
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<tr>
<td>bitterness</td>
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</tbody>
</table>
APPENDIX C

THE LATE EFFECT OF ACCIDENTAL INJURY QUESTIONNAIRE (LEAIQ)
The Late Effect of Accidental Injury Questionnaire (LEAIQ)

Questions about the accident and any resulting physical, psychological or social consequences.

Below you will find questions about the accident and the consequences the injury has had for you. Read each question carefully. We are most interested in the situation after the injury as compared with the situation before the injury. Put a cross in the square beside the answer you think most appropriate. It is important that you answer all the questions even if some of the questions seem unimportant to you.

If there is something you think is important or believe would be meaningful for others, which is not covered in the questions, please add this.

Name:
Registration number:
Year of birth:
Address:
Occupation today:
Married: yes □ no □

Cross off the answer which fits best. If you are in doubt choose the answer which you think is closest to your judgement.

Question 1
Have you had permanent physical changes as a result of the injury? yes □ no □

Question 2
Has the injury led to reduced physical function? yes □ no □
If yes, specify in which way .................................................................

Question 3
What kind of work/occupation do you have today? .................................................................

Question 4
Is your work/occupation today:
the same as before the injury □
different than before the injury □
sickness benefit/rehabilitation pension □
disability pension □
old age pension □
If changed, do you think this has a connection with the injury? yes □ no □

Question 5
How much have you worked after the injury? (Decide this in relation to what you usually did before the injury, whether it is paid work or housework, school/studies or another occupation.)
worked full time □
worked most of the time □
worked little or not at all □
have not worked and have not managed to
care for myself, for example bathe or dress
myself etc.

If changed, does this relate to the injury?
- yes
- no

Question 6
What pleasure do you have from your leisure
time after the injury in comparison to before the
injury?
- increased pleasure
- unchanged
- decreased pleasure

If changed, does this relate to the injury?
- yes
- no

Question 7
Compared with before the injury, has your con­
tact with others after the injury been:
- increased
- unchanged
- decreased

If changed, do you think this is related to the
injury?
- yes
- no

Question 8
How has your relationship with your own family
and/or spouse been after the injury compared
with before the injury?
- improved
- unchanged
- worsened

If changed, does this relate to the injury?
- yes
- no

Question 9
Have you, in the last 6 months been bothered by:
(Put a cross beside any of the complaints you
have had.)

fatigue
irritability
lack of initiative
mood swings
decreased performance
weakness
vertigo
sweating
digestive complaints
breathlessness
bodily aches and pains
headache
tendency to isolate myself from others
nightmares
restlessness
sleeping problems
fear, anxiety
tension
fear of a situation similar to that in which
the accident/injury took place
startled by abrupt, sharp or sudden noises
reduced memory
concentration difficulties
depression
bitterness

Underline the complaint you also had suffered
from before the injury.

If you had suffered from any of the complaints
you have today before the accident/injury, are
these
unchanged
worse

Do you believe that the complaints you have had
in the last 6 months have a connection with the
accident and/or the injury?
- yes
- no

Question 10
On the whole, how do you think your bodily
health has been after the injury compared with
before the injury?
- better
- the same
- worse
If changed, do you think this has a connection with the injury/accident?

- yes [ ]
- no [ ]

**Question 11**

On the whole, how do you think your psychological health ("nerves") has been after the injury as compared with before the injury?

- better [ ]
- the same [ ]
- worse [ ]

If changed, do you think this has a connection with the injury/accident?

- yes [ ]
- no [ ]

**Question 12**

How is your economic situation today compared with before the injury?

- better [ ]
- unchanged [ ]
- worse [ ]

If changed, do you think this has a connection with the injury?

- yes [ ]
- no [ ]

**Question 13**

Who do you consider was responsible for the accident/injury?

- myself [ ]
- others [ ]
- no one special, accidental [ ]

**Question 14**

Was anyone you knew well injured at the same time as you in the accident?

- no [ ]
- yes, survived [ ]
- yes, died [ ]

**Question 15**

What did you experience at the moment of the injury?

- Do not remember anything from the time around the injury [ ]
- Did not think I would be seriously injured [ ]
- Thought I would be seriously injured, crippled, etc. [ ]
- Thought I would die [ ]

**Question 16**

Do you feel that anything was lacking in the medical treatment you received? (Cross off several answers if necessary.)

- no [ ]
- yes, insufficient or incomplete medical evaluation/follow up [ ]
- yes, information about the nature of the injury and/or consequences [ ]
- yes, physiotherapy arrangements [ ]
- yes, the opportunity to talk about fear, anxiety and other feelings [ ]
- yes, information to my family [ ]
- other (Please specify) [ ]

**Question 17**

Do you feel that anything was lacking in the social or economic help you received? (Cross off as many answers as you find necessary.)

- No [ ]
- Yes, better information about social and economic support – and additional assistance (insurance benefits, practical help, etc.) [ ]
- Yes, better practical assistance (home help, babysitting or child care transportation help etc.) [ ]
- Yes, better economic assistance (compensation, various insurance benefits/support systems, etc.) [ ]
- Other (Please specify) [ ]

**Question 18**

Do you think that anything about the hospital treatment and/or the arrangements for further check ups after leaving hospital should be altered?

- yes [ ]
- no [ ]
If yes, please specify

If yes, please specify what you would like

Question 19
Are there still, as a result of the injury, any medical, psychological, social or economic conditions with which you would like help?

yes ☐
no ☐

If yes, please specify what you would like

Question 20
Additional comments:

Please, fill out questionnaire nr. 2 also.
(General Health Questionnaire, 20item version)
APPENDIX D

MODIFICATIONS TO THE LATE EFFECT OF
ACCIDENTAL INJURY QUESTIONNAIRE (LEAIQ)
Modifications made to convert the Late Effects of Accidental Injury Questionnaire 24-item checklist (LEAIQ; Malt, et al., 1989) to the Modified Late Effects of Accidental Questionnaire, Part II (MLEAIQ-II).

1. "Fatigue" was changed to "feel tired".
2. "Irritability" was changed to "feel jumpy".
3. "Lack of initiative" was changed to "trouble getting started during the day".
4. "Decreased performance" was changed to "decreased work performance" and "decreased physical performance".
5. "Weakness" was changed to "feel weak".
6. "Vertigo" was changed to "dizziness".
7. "Digestive complaints" was changed to "stomach problems".
8. "Breathlessness" was changed to "short of breath".
9. "Tendency to isolate myself from others" was changed to "want to be alone".
10. "Restlessness" was changed to "restlessness during the day and night".
11. "Fear, anxiety" was changed to "fear" and "stress".
12. "Reduced memory" was changed to "trouble remembering things".
13. "Concentration difficulties" was changed to "trouble concentrating".

APPENDIX E

REVISED IMPACT OF EVENT SCALE (RIES)
Revised Impact of Event Scale

Below is a list of comments made by people after stressful life events. Please check each item, indicating how frequently these comments were true for you during the PAST MONTH. If they did not occur during that time, please mark the "not at all" column.

<table>
<thead>
<tr>
<th>Comment</th>
<th>NOT AT ALL</th>
<th>RARELY</th>
<th>SOMETIMES</th>
<th>OFTEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>I thought about the accident when I didn't mean to.</td>
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<tr>
<td>I avoided letting myself get upset when I thought about the accident or was reminded of it.</td>
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<tr>
<td>I tried to remove the accident from memory.</td>
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<tr>
<td>I had trouble falling asleep or staying asleep, because of pictures or thoughts about the accident that came into my mind.</td>
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<tr>
<td>I had dreams about the accident.</td>
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<tr>
<td>I had waves of strong feelings about the accident.</td>
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<tr>
<td>I stayed away from reminders of the accident.</td>
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<tr>
<td>I felt as if the accident hadn't happened or it wasn't real.</td>
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<tr>
<td>I tried not to talk about the accident.</td>
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<tr>
<td>Pictures about the accident popped into my mind.</td>
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<tr>
<td>Other things kept making me think about the accident.</td>
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<tr>
<td>I was aware that I still had a lot of feelings about the accident, but I didn't deal with them.</td>
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</tr>
<tr>
<td>I tried not to think about the accident.</td>
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</tr>
<tr>
<td>Any reminder brought back feelings about the accident.</td>
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</tr>
<tr>
<td>My feelings about the accident were kind of numb.</td>
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</tbody>
</table>
APPENDIX F

SELECTED RESPONSES TO "HAVE YOU HAD ANY PERMANENT PHYSICAL CHANGES AS A RESULT OF YOUR INJURY?"
Selected subject responses to the item, "Have you had permanent physical changes as a result of your injury?".

- "Back is not fulling healed so with hard labor or exercise it still bugs me"
- "Limited neck movement, weaker rt arm and shoulder ability"
- "My leg had a compound fracture to the femer. So my leg isn't totally straight"
- "...continuing double vision"
- "Scars, harington rods in back, dry cathe(ing), numbness in lower extremeties, -- nerve damage in right foot"
- "I limp permanently"
- "Loss of feeling on foot, leg & head"
- "Unable to walk"
- "Walk with a limp"
- "...I have only partial use of right arm"
- "Physically weaker--less strength--less stamina--greater require­ment for rest"
- "Toes don't move and can't get around very good"
- "Loose a foot"
- "Scars and bone deformity of right clavicle"
- "Restructured knee (L) and hip"
- "Scars on my chest and a weak left lung"
- "Cannot used my right arm like I used to"
APPENDIX G

SELECTED RESPONSES TO "HAVE YOU HAD ANY MAJOR UPSETS WITHIN THE PAST YEAR?"
Selected subject responses to the item "have you had any major upsets within the past year?"

--- "Death of my father"
--- "Lost work"
--- "Change in financial status"
--- "Diagnosed as having non-Hodgkins lymphoma...receiving...chemotherapy"
--- "Father passed away, also brother-in-law and helping my mother with her stress"
--- "Have become extremely poor"
--- "Divorced"
--- "Husband failed exams at U of A requiring an extra year of schooling"
--- "Recalled to the Army for Desert Storm, my Dad and two cousins going over to the desert"
--- "Forced retirement"
--- "I've had 3 deaths in my family one of them from a car accident, financially I was out of work for quite sometime. I have not had a steady job..."
--- "I was on Workman's Compensation which has just recently been terminated"
--- "Husband died as a result of accident. No income, no help"
--- "The death of my wife at the time of my accident (she was also in the accident with me)"
APPENDIX H

APPROVAL FORMS
June 5, 1991

Suzanne Clark RN
10130 N. Sawgrass Drive
Tucson, Arizona 85737

Re: Post-Traumatic Stress Disorder Symptomatology in a Traumatically Injured Population

Dear Ms. Clark:

Thank you for presenting your research proposal at the Human Research Committee meeting on June 4, 1991. The committee has given your study approval based on your presentation. At this time you may begin data collection.

It is understood that no changes will be made to your study without the knowledge and approval of the Human Research Committee. Please be aware that a copy of the consent form must be placed in the patient's medical record.

Review has been set at six months. As part of our quality assurance program we request that you submit a list of TMC enrollees in your study with your six month Activity Status Report. We will be doing periodic audits of the medical record.

Should you have any questions, please contact me at 324-5332 or Chris Arslanian, RN, MS, Research Associate at 324-5512.

Sincerely,

Ronald Spark, MD, Chairman
TMC Human Research Committee

RPS:mel
May 13, 1991

Susanne J. Clark, R.N.
c/o Leanna Crosby, Ph.D.
College of Nursing
Arizona Health Sciences Center

RE: ESC A91.22 POST-TRAUMATIC STRESS DISORDER SYMPTOMATOLOGY IN A TRAUMATICALLY INJURED POPULATION

Dear Ms. Clark:

We received your 13 May 1991 letter in reference to your above cited project. Change involves extension of inclusive dates for investigation of research population to 1 January 1990 - 30 May 1991 vs 15 September 1990 - 15 February 1991. Approval for this change is granted effective 13 May 1991.

The Human Subjects Committee (Institutional Review Board) of the University of Arizona has a current assurance of compliance, number M-1233, which is on file with the Department of Health and Human Services and covers this activity.

Approval is granted with the understanding that no further changes or additions will be made either to the procedures followed or to the consent form(s) used (copies of which we have on file) without the knowledge and approval of the Human Subjects Committee and your College or Departmental Review Committee. Any research related physical or psychological harm to any subject must also be reported to each committee.

A university policy requires that all signed subject consent forms be kept in a permanent file in an area designated for that purpose by the Department Head or comparable authority. This will assure their accessibility in the event that university officials require the information and the principal investigator is unavailable for some reason.

Sincerely yours,

William F. Denny, M.D.
Chairman
Human Subjects Committee

cc: Departmental/College Review Committee
Dear Ms. Clark:

We received your project approval form and consent form for your above referenced project. The procedures to be followed in this study pose no more than minimal risk to participating subjects. Regulations issued by the U.S. Department of Health and Human Services [45 CFR Part 46.110(b)] authorize approval of this type project through the expedited review procedures, with the conditions(s) that subjects' anonymity be maintained. Although full Committee review is not required, a brief summary of the project procedures is submitted to the Committee for their endorsement and/or comment, if any, after administrative approval is granted. This project is approved effective 4 March 1991 for a period of one year.

The Human Subjects Committee (Institutional Review Board) of the University of Arizona has a current assurance of compliance, number H-1233, which is on file with the Department of Health and Human Services and covers this activity.

Approval is granted with the understanding that no further changes or additions will be made either to the procedures followed or to the consent form(s) used (copies of which we have on file) without the knowledge and approval of the Human Subjects Committee and your College or Departmental Review Committee. Any research related physical or psychological harm to any subject must also be reported to each committee.

A university policy requires that all signed subject consent forms be kept in a permanent file in an area designated for that purpose by the Department Head or comparable authority. This will assure their accessibility in the event that university officials require the information and the principal investigator is unavailable for some reason.

Sincerely yours,

William F. Denny, M.D.
Chairman, Human Subjects Committee

cc: Departmental/College Review Committee
APPENDIX I

SUBJECT CONSENT FORMS
Subject's Consent Form
Post-Traumatic Stress Disorder in a Traumatically Injured Population

I am being asked to read the following material to ensure that I am informed of the nature of this research study and of how I will participate in it, if I consent to do so. Signing this form will indicate that I have been so informed and that I give my consent. Federal regulations require written informed consent prior to participation in this research study so that I can know the nature and the risks of my participation and can decide to participate or not participate in a free and informed manner.

PURPOSE

I am being invited to voluntarily participate in the above-titled research project. The purpose of this project is to determine if there is a link between a serious injury and the symptoms of stress.

SELECTION CRITERIA

I am being invited to participate because I have had a serious injury following an accident. Approximately 60 persons will be enrolled in this study.

PROCEDURE

If I agree to participate, I will be asked to agree to the following: to answer a series of questions regarding any changes in my life following the accident. It is estimated that it will take 15-30 minutes to complete this questionnaire.

RISKS

There are no identified physical risks associated with participation in this research study.

BENEFITS

There are no benefits to be derived from participation in this study.

CONFIDENTIALITY

The questionnaire will not contain the name of the participant. Only an identification number, assigned by the researcher, will be on the questionnaire itself. This is to provide complete anonymity for each participant. A list of the participants and their assigned identification numbers will be stored at the College of Nursing in a locked file cabinet, in room 351. The only persons with access to this file will be: Susanne J. Clark, principal investigator.
NAME Susanne J. Clark  
POSITION/TITLE Graduate student  
COLLEGE OF NURSING  
P.I. TELEPHONE NUMBER 575-0867  

PARTICIPATION COSTS  

There are no participation costs.  

AUTHORIZATION  

"BEFORE GIVING MY CONSENT BY SIGNING THIS FORM, THE METHODS, INCONVENIENCES, RISKS, AND BENEFITS HAVE BEEN EXPLAINED TO ME AND MY QUESTIONS HAVE BEEN ANSWERED. I UNDERSTAND THAT I MAY ASK QUESTIONS AT ANY TIME AND THAT I AM FREE TO WITHDRAW FROM THE PROJECT AT ANY TIME WITHOUT CAUSING BAD FEELINGS OR AFFECTING MY MEDICAL CARE. MY PARTICIPATION IN THIS PROJECT MAY BE ENDED BY THE INVESTIGATOR OR BY THE SPONSOR FOR REASONS THAT WOULD BE EXPLAINED. NEW INFORMATION DEVELOPED DURING THE COURSE OF THIS STUDY WHICH MAY AFFECT MY WILLINGNESS TO CONTINUE IN THIS RESEARCH PROJECT WILL BE GIVEN TO ME AS IT BECOMES AVAILABLE. I UNDERSTAND THAT THIS CONSENT FORM WILL BE FILED IN AN AREA DESIGNATED BY THE HUMAN SUBJECTS COMMITTEE WITH ACCESS RESTRICTED TO THE PRINCIPAL INVESTIGATOR, SUSANNE J. CLARK, OR AUTHORIZED REPRESENTATIVE OF THE COLLEGE OF NURSING DEPARTMENT. I UNDERSTAND THAT I DO NOT GIVE UP ANY OF MY LEGAL RIGHTS BY SIGNING THIS FORM. A COPY OF THIS SIGNED CONSENT FORM WILL BE GIVEN TO ME."

Subject's Signature ___________________________ Date ___________________________  

INVESTIGATOR  

I have carefully explained to the subjects the nature of the above project. I hereby certify that to the best of my knowledge the person who is signing this consent form understands clearly the nature, demands, benefits, and risks involved in his/her participation and his/her signature is legally valid. A medical problem or language or educational barrier has not precluded this understanding.  

Signature of investigator ___________________________ Date ___________________________
Subject's Consent Form
Post-Traumatic Stress Disorder in a Traumatically Injured Population

I AM BEING ASKED TO READ THE FOLLOWING MATERIAL TO ENSURE THAT I AM INFORMED OF THE NATURE OF THIS RESEARCH STUDY AND OF HOW I WILL PARTICIPATE IN IT, IF I CONSENT TO DO SO. SIGNING THIS FORM WILL INDICATE THAT I HAVE BEEN SO INFORMED AND THAT I GIVE MY CONSENT. FEDERAL REGULATIONS REQUIRE WRITTEN INFORMED CONSENT PRIOR TO PARTICIPATION IN THIS RESEARCH STUDY SO THAT I CAN KNOW THE NATURE AND THE RISKS OF MY PARTICIPATION AND CAN DECIDE TO PARTICIPATE OR NOT PARTICIPATE IN A FREE AND INFORMED MANNER.

PURPOSE

I am being invited to voluntarily participate in the above-titled research project. The purpose of this project is to determine if there is a link between a serious injury and the symptoms of stress.

SELECTION CRITERIA

I am being invited to participate because I have had a serious injury following an accident. Approximately 60 persons will be enrolled in this study.

PROCEDURE

If I agree to participate, I will be asked to agree to the following: to answer a series of questions regarding any changes in my life following the accident. It is estimated that it will take 15-30 minutes to complete this questionnaire.

RISKS

There are no identified physical risks associated with participation in this research study.

BENEFITS

Each subject will receive a two-dollar bill after returning the completed questionnaires.

CONFIDENTIALITY

The questionnaire will not contain the name of the participant. Only an identification number, assigned by the researcher, will be on the questionnaire itself. This is to provide complete anonymity for each participant. A list of the participants and their assigned identification numbers will be stored at the College of Nursing in a locked file cabinet, in room 351. The only persons with access to this file will be: Susanne J. Clark, principal investigator.
NAME  Susanne J. Clark
POSITION/TITLE  Graduate student
COLLEGE OF NURSING/UNIVERSITY OF ARIZONA
P.I. TELEPHONE NUMBER  575-0867

PARTICIPATION COSTS

There are no participation costs.

AUTHORIZATION

"BEFORE GIVING MY CONSENT BY SIGNING THIS FORM, THE METHODS,
INCONVENIENCES, RISKS, AND BENEFITS HAVE BEEN EXPLAINED TO ME AND
MY QUESTIONS HAVE BEEN ANSWERED. I UNDERSTAND THAT I MAY ASK
QUESTIONS AT ANY TIME AND THAT I AM FREE TO WITHDRAW FROM THE
PROJECT AT ANY TIME WITHOUT CAUSING BAD FEELINGS OR AFFECTING MY
MEDICAL CARE. I UNDERSTAND THAT I AM GIVING MY CONSENT FOR THE
INVESTIGATOR, MEMBERS OF THE TUCSON MEDICAL CENTER'S HUMAN
RESEARCH COMMITTEE AND POSSIBLY THE FDA TO ACCESS MY MEDICAL
RECORD. MY PARTICIPATION IN THIS PROJECT MAY BE ENDED BY THE
INVESTIGATOR OR BY THE SPONSOR FOR REASONS THAT WOULD BE
EXPLAINED. NEW INFORMATION DEVELOPED DURING THE COURSE OF THIS
STUDY WHICH MAY AFFECT MY WILLINGNESS TO CONTINUE IN THIS
RESEARCH PROJECT WILL BE GIVEN TO ME AS IT BECOMES AVAILABLE. I
UNDERSTAND THAT THIS CONSENT FORM WILL BE FILED IN AN AREA
DESIGNATED BY THE HUMAN RESEARCH COMMITTEE WITH ACCESS RESTRICTED
TO THE PRINCIPAL INVESTIGATOR, SUSANNE J. CLARK, OR AUTHORIZED
REPRESENTATIVE OF THE COLLEGE OF NURSING DEPARTMENT. I
UNDERSTAND THAT I DO NOT GIVE UP ANY OF MY LEGAL RIGHTS BY
SIGNING THIS FORM. A COPY OF THIS SIGNED CONSENT FORM WILL BE
GIVEN TO ME.

Subject's Signature ___________________________  Date __________
Witness Signature ___________________________  Date __________

INVESTIGATOR

I have carefully explained to the subjects the nature of the
above project. I hereby certify that to the best of my knowledge
the person who is signing this consent form understands clearly
the nature, demands, benefits, and risks involved in his/her
participation and his/her signature is legally valid. A medical
problem or language or educational barrier has not precluded this
understanding.

Signature of investigator ___________________________  Date __________
APPENDIX J

PERMISSION TO USE INSTRUMENTS
17 Sept 90

Mardi J. Horowitz, M.D.
Professor of Psychiatry
Director of the Center for the Study of Neuroses
Langley Porter Psychiatric Institute
San Francisco, California 94143

Dear Dr. Horowitz:

This letter is to request permission to use the Impact of Event Scale in conjunction with my graduate thesis.

I am a graduate nursing student who will be investigating the occurrence of Post-traumatic Stress Disorder (PTSD) symptomatology in multiple trauma patients using a descriptive exploratory approach with a nursing focus.

If you are interested, I will be more than happy to share the results of my pilot study with you. Thesis completion is scheduled for April 1991.

Enclosed please find a self-addressed stamped envelope for returning your reply.

Thank you,

Susanne J. Clark
Captain, United States Army
Army Nurse Corps
Dear Captain Clark:

Thank you very much for your letter of Sept 14 requesting permission to use the LEAIQ. Of course you have the permission to use it! I'm just happy that the questionnaire, which we have found to be of much help in screening patients, is used.

Currently we are analyzing more data obtained with the LEAIQ in collaboration with Dr. Gary Bell, London. We are also comparing LEAIQ complaints with clinical examinations including surgical assessments. I'll put you on my mailing list to keep you informed.

I'm most interested to hear about your own results, and if you should have an extra copy of your thesis when it is finished, I'll be most happy to receive one.

Good luck with your studies.

Best wishes

Ulrik Fredrik Malt
Professor of Psychiatry
Head of Department
REFERENCES


(1977). The SCL-90 manual I: Scoring, administration and procedures for the SCL-90. Baltimore, MD: Johns Hopkins University School of Medicine, Clinical Psychometrics Unit.


