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Subjective complaints and return to employment after mild traumatic brain injury

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**Subjective complaints and return to employment after mild
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San Jose State University, 1994

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SUBJECTIVE COMPLAINTS AND RETURN
TO EMPLOYMENT AFTER
MILD TRAUMATIC BRAIN INJURY

A Thesis

Presented to

The Faculty of the School of Nursing

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

by

Sarra Chaffin

May, 1994

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ABSTRACT

SUBJECTIVE COMPLAINTS AND RETURN TO EMPLOYMENT AFTER MILD TRAUMATIC BRAIN INJURY

by Sarra Chaffin

This descriptive study used a telephone survey to collect information about symptoms 4 years after mild traumatic brain injury (MTBI). The investigation was a follow-up study of patients surveyed 1 to 3 months after injury. Twenty out of 77 reported symptoms in the 1 to 3 month post injury survey. Six out of 29 individuals reported symptoms 4 years after injury. The 6 subjects describing complaints had returned to work in a mean time of 27 weeks. The 23 subjects without complaints had returned to work in a mean time of 2 weeks. The number and severity of symptoms decreased over time. Recommendations include study replication and intervention studies to define outcomes.

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Chapter 1

INTRODUCTION

In 1986, The National Head Injury Foundation (NHIF) expressed concern regarding the lack of attention given to the problems of mild traumatic brain injury (MTBI) clients (National Head Injury Foundation, 1986a). The NHIF reports gross ignorance and neglect of the long-term problems associated with MTBI. The NHIF (1986a) states that 300,000 brain injuries, which are less than severe, occur each year. In a study by Alexander (1992), out of 36 brain injured clients 20 injuries occurred from motor vehicles, 5 from falls, and 11 individuals were struck, Bailey and Gudeman (1989) report 50% of all brain injuries were sustained in motor vehicle accidents, and Leininger, Gramling, Farrell, Kreutzer, and Peck (1990) in a group of 53 stated that between 90%-93% of these individuals were injured in motor vehicle accidents. Alves, Coloban, O'Leary, Rimel, and Jane (1986) cite that 25% and Mandel (1989) contends that 50% of these individuals with MTBI have organic disease. According to Kay (1986), these individuals require education, neurologic testing, and treatment to prevent the serious complications of depression, fear of going crazy, conditioned anxiety, lack of insight, and psychiatric imbalance. The cost to society in loss of productivity within the work force, Workers' Compensation, welfare, does not compare to the personal suffering, loss of relationships,

self-esteem, and belonging experienced by the individual with MTBI. These individuals with MTBI have the right to function to their fullest potential.

Individuals with MTBI seen in emergency facilities often suffer only a brief alteration of consciousness or period of confusion, and are discharged home or admitted to the hospital for 24-48 hours. They are perceived as having made quick medical recoveries and receive no formal rehabilitation. These individuals with MTBI appear fine until they attempt to resume their responsibilities at home, work, or school. A significant number experience grave difficulty, exhibiting postconcussive complications and neuropsychological deficits (Leininger et al., 1990). Leininger and associates (1990) report individuals with MTBI performed significantly poorer than uninjured controls on four of eight neuropsychological tests. The occurrence or non-occurrence of a traumatic loss of consciousness does not seem to distinguish persons at greater or reduced risk for neuropsychological consequences (Leininger et al., 1990). These individuals complain of problems in the areas of memory, concentration, organization, and the ability to complete more than one task at a time (Kay, 1986). Medical professionals are unable to discover any obvious neurological problems and conclude that the individual with MTBI has psychiatric problems or is malingering. Individuals with MTBI may have significant cognitive, emotional, and behavioral deficits that interfere with their ability to lead functional lives (Kay, 1986).

Individuals with MTBI may have few, if any, physical complaints, and some may have cognitive limitations such as: memory problems, concentration-attention deficits (Bailey & Gudeman, 1989; Mattis, 1989), slower information processing, difficulty learning new information (Kay, 1986), word finding problems, and slowing of performance (Ruff, Levin, & Marshall, 1986). The majority of the complaints may be emotional in nature such as: depression, anxiety, irritability, mood swings (Ruff et al., 1986), fatigue, emotional lability, disturbed sleep pattern, being easily upset or frustrated, and having temper outbursts (Bailey & Gudeman, 1989; Kay, 1986). Jones and associates stated that 21% of the individuals with MTBI were experiencing symptoms 2-6 months post injury as reported by their primary care physicians (Jones, Viola, LaBan, Schynoll, & King, 1992). Wrightson and Gronwell (1981) conducted a carefully controlled prospective study of time off work and symptoms of MTBI. Mean time off work after injury was 4.5 days, but 20% of the 66 men had symptoms 90 days post injury and 4 had symptoms 2 years post injury. Sixty percent of the individuals who were working had common symptoms of feelings of being different, in a dream, detached, slow or hazy, having impaired performance, poor memory, fatigue, poor concentration, inability to make decisions or solve problems, irritability, increased sensitivity to noise, headache, diplopia, photophobia, impaired balance, and fear of further injury. Alves et al. (1986) cited this study to show that there is no relationship between the severity of

postraumatic symptoms and the length of time until the individual returned to work. After injury, vague, misdiagnosed, or undiagnosed complaints may be realized. Bailey and Gudeman (1989) measured the dysfunction of the individual with MTBI by quantifying a decrease in recreation, alterations in work history, and changes in marital status.

Compensation payment factors and pending litigation are often cited as playing an important role in the evolution of post traumatic sequelae of the individual with MTBI. When litigation is in progress, symptomatology needs to be brought into perspective because of the potential for secondary financial gain. Evidence exists to indicate that the presence of postconcussive symptoms is not dependent upon litigation (Ruff, Levin, & Marshall, 1986). However, secondary gain related to ongoing litigation has a role in post injury neuropsychological symptomatology, particularly in individuals with mild injuries. In a study conducted by Bornstein, Miller, and Schoor (1989) to examine the relationship between neuropsychological deficits and emotional disturbance in individuals with brain injuries, compensation factors were controlled since all individuals with MTBI were receiving compensation in connection with work related injuries. This study showed a consistent positive relationship between the degree of cognitive deficit and the level of emotional disturbance independent of compensation factors. Alexander (1992) found that malingering as the sole diagnosis was rare, but depression related to the initial disability,

change in work, decrease in income, guilt, and victimization when combined with chronic pain, especially headache, seemed to contribute to post injury symptoms. Malingering may be an occasional factor but can only be detected through the use of clinical judgment, because there are no validated objective criteria for its identification on neuropsychological testing. Assumptions cannot be made that every individual who is pursuing a compensation claim or litigation is having symptoms that are exacerbated or prolonged by the claim. On the other hand, settlement of a claim does not cure individuals with MTBI. MTBI can lead to prolonged symptomatology even when there is no hope of compensation (Levin, Eisenberg, & Benton, 1989).

Statement of the Problem

The common sequelae identified post MTBI are loss of employment, less recreation (Bailey & Gudeman, 1989), headache, dizziness, fatigue, loss of memory, inability to concentrate, taking longer to process information, irritability, blurred vision, insomnia, depression, decreased attention, and noise intolerance (Mahon & Elger, 1989). This study investigated the length of these sequelae. Many studies have been conducted from 1 month to 2 years after MTBI, but few have been conducted 4 years post injury (Alexander, 1992; Englander, Hall, Stimpson, & Chaffin, 1992; Jones et al., 1992; Kraus & Nourjah, 1988; Levin et al., 1987; Wrightson & Gronwall, 1981). The need for this study was compelling because few recent studies have been conducted on the long-term effects of

MTBI (Alexander, 1992; Englander et al., 1992; Jones et al., 1992; Kraus & Nourjah, 1988).

Statement of Need

Current problems and conditions regarding MTBI are subjective complaints which characterize physical, neuropsychological, emotional, social, and economic functioning (Bornstein et al., 1989; Leininger et al., 1990; Levin et al., 1989). It is important the clinicians be knowledgeable about the potentially serious consequences of MTBI, so that a neuropsychological evaluation of the symptomatic individual be completed for the establishment of an appropriate treatment plan (Leininger et al., 1990). Recommendations for evaluation and treatment of individuals with MTBI will remediate symptoms and decrease length of time off work and increase the likelihood of meaningful relationships. In a study conducted by Hinkle, Wayne, Rimell, and Jane (1986), information and reassurance may have helped individuals with MTBI resume prior levels of work and social functioning in a shorter period of time. Gronwall (1986) states that, reassurance, education, support, and regular monitoring of progress are essential for the rehabilitation of the individual with MTBI. Therefore, a study to explore the number and severity of subjective complaints was needed in order to substantiate the need for support and treatment programs such as Early Education and Assessment, The Mild Traumatic Brain Injury Clinic, The Alcohol and Drug Education Group, The Mild Traumatic Brain Injury Support Group,

and Case Management to address long-term problems experienced by these clients.

Purpose of the Study

The purpose of this study was to evaluate and collect factual information from clients with MTBI according to the number and severity of complaints 4 years post injury. These complaints were explored after 4 years and compared to rates of return to employment, marital status change, and pending litigation.

Research Questions

The following research questions were identified for this study:

1. How many individuals with MTBI report symptoms 4 years post injury?
2. What is the severity of the symptoms of individuals with MTBI after 4 years?
3. Has there been a change in the employment or marital status of those individuals with MTBI who report symptoms after 4 years?
4. Is there any pending litigation connected with the MTBI of individuals who report symptoms after 4 years?
5. When this study is compared with the findings of the Englander et al. study (1992), are there any variations in the subjective complaints?

Definition of Terms

For the purpose of this study, the following definitions apply:

1. Employment is work, occupation, profession, or job for which monetary compensation is received.
2. Galveston Orientation and Amnesia Test (GOAT) evaluates the major spheres of orientation, time, place, and person, and estimates the interval following the injury for which the individual is unable to recall any events and estimates the interval antedating the injury for which no events are recalled (Grossman, Levin, & O'Donnell, 1979).
3. Glasgow Coma Scale (GCS) measures the severity of acute impairment of function on a 15-point scale through eye opening, motor response, and verbal response (Jennet & Teasdale, 1974).
4. Litigation is a lawsuit, legal action, a confrontation in a court of law to enforce a right or seek compensation (Black, 1979).
5. Marital status refers to rights and duties arising from a marriage contract and constituting its object, and therefore embracing what the parties agree to perform towards each other and to society (Black, 1979). Marital status is not limited by a legal contract.
6. Mild traumatic brain injury (MTBI) is trauma in which the head is struck or moves violently resulting in a transient alteration of consciousness, a brief loss of consciousness (Kay, 1986), or a period of confusion as measured

by a score of less than 75 by the Galveston Orientation and Amnesia Test (GOAT) (Englander et al., 1992), with a Glasgow Coma Score (GCS) of 13-15, and post-traumatic amnesia of less than 48 hours (Englander et al., 1992).

7. Symptoms:

a. Cognitive symptoms include problems with learning and memory, decreased speed and capacity of information processing, problems with complex attention, and deficits in integrative and abstract thinking (Kay, 1986).

b. Emotional symptoms include daydreaming, low frustration tolerance, irritability, decrease in social activities, new problems getting along with others, depression, and increased anxiety (Englander et al., 1992).

c. Physical symptoms include fatigue, headaches, change in sleep pattern, muscle weakness, dizziness, tinnitus, blurred vision, diplopia, decrease in hearing, decrease in noise tolerance, decrease in coordination or balance, seizure activity, new allergies, nausea or vomiting, alteration in sense of smell or taste, and decrease in ability to tolerate the effects of alcohol (Englander et al., 1992).

Summary

The NHIF (1986a) reported that 300,000 brain injuries occur each year that are less than severe. Up to 50% (Mandel, 1989) of these individuals have organic disease requiring education, neurological testing, and treatment to

prevent the serious complications of depression, fear of going crazy, conditioned anxiety, lack of insight, and psychiatric imbalances (Kay, 1986). The financial and personal losses associated with MTBI demands that education, evaluation, and rehabilitation be provided as a means to preclude serious consequences. Litigation and malingering are factors that are often questioned by payer sources, employers, and families, especially when medical and neuropsychological testing cannot prove that symptoms have an organic bases. This study examined how many individuals with MTBI reported symptoms 4 years after injury, the severity of these symptoms, changes in employment or marital status, and pending litigation. The findings of this study were compared with the Englander et al. study (1992).

Chapter 2

CONCEPTUAL FRAMEWORK AND REVIEW OF LITERATURE

Introduction

From 500,000 to 700,000 traumatic brain injuries (TBI) occur each year as a result of diverse accidents. About 200,000 individuals of the brain injured population die or survive with a severe TBI (National Head Injury Foundation, 1986a). According to the National Head Injury Foundation (NHIF) (1986a), there are a large number of individuals who, after a disruption of brain functioning, are termed to have a mild traumatic brain injury (MTBI). Englander et al. (1992) defines MTBI as a loss or alteration of consciousness, having a period of posttraumatic amnesia (PTA) (a period of time in which a TBI individual is in a confused state after brain injury lasting less than 48 hours and has a Glasgow Coma Scale (GCS) score of 13 or greater on admission to the Emergency Room). According to Alves et al. (1986), about 25% of those clients diagnosed as having MTBI are subject to sequelae, but Mandel (1989) cites the incidence as high as 50%. Jones et al., (1992), in their retrospective mail survey of physicians who treat MTBI, documented that the incidence of symptoms after MTBI is 21%. Englander et al. (1992) documented 26% of individuals with MTBI had symptoms at 1-3 months postinjury. The National

Head Injury Foundation (1986b) has termed MTBI as "The Unseen Injury" because in many cases the cause of obscure symptoms is not diagnosed.

Mandel (1989) states that postconcussion syndrome is an organic disease requiring early neurologic testing and treatment to prevent serious complications. Earlier studies (Gronwall, 1986; Wrightson & Gronwall, 1981) of individuals with MTBI returning to work were conducted in New Zealand. Generalization to the United States may not be appropriate given differences in economic, governmental, and social structures in New Zealand. There is limited information which documents problems individuals with MTBI have returning to work with symptoms which result in loss of employment or employment at a lower level.

Pathophysiology of Diffuse Mild Brain Injury

In the diffuse mild brain injury, axonal nerve fibers are permanently damaged by the microscopic stretching and tearing, and therefore function abnormally or not at all (Kay, 1986). Metabolic abnormalities in diffuse MTBI cause an increase in cerebral circulation time and an increase in acetylcholine which blocks synaptic transmission (Mandel, 1989). These injuries are not diagnosed on CT scans or neurological examinations because there is no focal evidence of brain damage (Kay, 1986; Mandel, 1989).

Pathophysiology of Focal Mild Brain Injury

Focal mild brain injury involves grossly observable tissue damage, and is the result of the soft brain colliding with the bony inside surface of the skull.

Focal mild brain injury involves fronto-temporal lesions and coup/contre-coup lesions in which a sharp blow to the skull bruises the brain immediately below and sends the brain bouncing off the opposite side of the skull (Kay, 1986). The fronto-temporal focal lesions cause deficits in learning, memory, planning, organization, attention, concentration, and emotional control (Bailey & Gudeman, 1989; Kay, 1986; Levin et al., 1987; Mattis, 1989). The coup/contre-coup lesion deficits include, but are not limited to, problems with language, perception (Kay, 1986; Ruff et al., 1986), sensory functions, motor functions (Kay, 1986; Ruff et al., 1986), and sensory-motor integration, arithmetic calculations, and sequencing (Kay, 1986). Both the fronto-temporal and coup/contre-coup injuries may occur independently or with mild diffuse injury (Kay, 1986; Mandel, 1989).

Pathophysiology of Cognitive Dysfunction

The diffuse cognitive problems that an individual with MTBI may experience are a decrease in speed and capacity of information processing (Kay, 1986; Levin et al., 1987; Mahon & Elger, 1989), difficulty in concentration, splitting or shifting attention among tasks, disorders of learning and memory, and deficits in integrative and abstract thinking (Bailey & Gudeman, 1989; Kay,

1986; Levin et al., 1987). Impaired memory and concentration can also be caused by depression and chronic pain, and it is difficult to specifically attribute them to MTBI (Alexander, 1992).

Pathophysiology of Physical Dysfunction

In addition to cognitive problems, the individual with MTBI may experience physical complaints such as dizziness (Levin et al., 1987; Mandel, 1989; Mattis, 1989), headaches (Levin et al., 1987; Mattis, 1989; Mahon & Elger, 1989; Mandel, 1989), fatigue (Hinkle et al., 1986; Levin et al., 1987); blurred vision, insomnia (Bailey & Gudeman, 1989; Mahon & Elger, 1989), noise intolerance (Mahon & Elger, 1989), tinnitus, nausea, weakness, diplopia, and hearing problems (Hinkle et al., 1986). In 1992, Michael Alexander studied 35 individuals with brain injury with persistent neurologic symptoms at least 6 months after injury. When the individuals with MTBI were compared to the group of individuals with severe brain injury, the group with MTBI reported significantly greater prevalence of pain (severe 38%, mild 87%; $p=.008$), primarily headache. Alexander (1992) also found that the individuals with MTBI had reduced functional capacity, depression, and fatigue.

Psychosocial Dysfunction

These cognitive and physical problems experienced by the individual with MTBI have a negative impact on life in vocational, personal, and social areas. Alexander (1992) cited depression, irritability, unresolved legal issues, increased

injuries in the work place, sleep disorders, and difficulties with routine daily activities as common complaints of the individuals with MTBI. The greatest changes noted by the individual with MTBI were in employment and leisure activities (Bailey & Gudeman, 1989). In a study of 66 men with MTBI in New Zealand, the mean time off work was 4.7 days (Wrightson & Gronwall, 1981). However, 66% of the patients had symptoms and 46% could not perform their job as well for a mean time of 14 days and 20% had symptoms at 90 days. The study showed that leisure activities were affected for a similar length of time and fatigue was a common factor.

Alves et al. (1986) stated that early posttraumatic symptoms were often associated with progressive improvement whereas late symptoms were associated with psychosocial dysfunctioning and were often persistent and lingering. It could not be concluded that these symptoms are purely psychogenic in origin. As recovery occurs the interaction between psychosocial and cognitive factors may produce behavioral changes and emotional symptoms that are organically based. Organically based cognitive dysfunctioning may lead to emotional problems including dysfunctional scenarios of depression, fear of going crazy, conditioned anxiety, lack of insight, and psychiatric imbalance (Kay, 1986). The major research on MTBI has focused on neuropathological, neurophysiological, and neuropsychological changes; the results of such investigations have shown objective

neuropsychological changes (Alexander, 1992; Bornstein et al., 1989; Leininger et al., 1990). Measurement of personality and emotional factors is very complex. It is hard to draw conclusions based solely on neurological or neuropsychological findings.

Litigation and Compensation

Historically, researchers have tried to connect latent MTBI symptoms with compensation and pending litigation (McKinlay, Brooks & Bond, 1983). Wrightson and Gronwall (1981) reported that disability and litigation are partly influenced by compensation. As a result of the interaction between neurophysical and psychosocial aspects, no specific syndrome has been identified and only recently have MTBI symptoms been given credibility. Litigation and compensation claims are additional stressors that may contribute to the complaints of the individual with MTBI but there is no evidence to substantiate this assumption. No causal relationship between symptoms and litigation has been demonstrated.

Client Education

Levin et al. (1987) state that clients treated in emergency rooms for MTBI are given minimal or no instructions regarding the development of neurobehavioral sequelae and the course of events, residual effects, or evaluation. This leads to emotional distress and aggravation of symptoms and excessive time away from work. In the St. Anthony Hospital study in 1989, it

was noted that 88% of patients with MTBI were not seen by a neurologist or neurosurgeon in the hospital setting and were released without information about posttraumatic symptoms (Mahon & Elger, 1989). Therefore, there is a need for the education of the individual with MTBI before discharge from the hospital to decrease unnecessary distress. Both verbal and written information is necessary because symptoms often become evident when the individual with MTBI returns to work or school.

In 1988 to 1989, in a pilot program at a northern California county hospital (Englander et al., 1992), individuals with MTBI admitted to the hospital for observation were provided with education in the form of a brief interview and a brochure on MTBI from the National Head Injury Foundation (1986b). One to 3 months post injury, 77 of these individuals were followed with a telephone survey. The survey determined frequency and severity of post traumatic symptoms and rate of return-to-work or school through a Subjective Complaint Scale and interview. The results of this survey showed that 26% of the individuals with MTBI had subjective complaints; 88% had returned to work or school, and only 45% of those with symptoms sought medical intervention. These results may reflect the education clients received about post-traumatic symptoms and that symptoms would diminish over time (Englander et al., 1992). Hinkle et al. (1986) conducted a research project on restoring social competence in individuals having MTBI. Clients with MTBI were divided into

three groups, (a) Routine Care, (b) Information, and (c) Information and Reassurance. The Information and the Information and Reassurance groups returned to social activity and work 1 week earlier than the Routine Care group.

Financial Costs

In addition to the physical, cognitive, and psychosocial symptoms suffered by individuals with MTBI, cost factors contribute a considerable financial burden to society. In 1981, the University of California conducted a study of the incidence of MTBI in San Diego County and found that 131 individuals out of 100,000 suffered mild concussion at an annual cost of six million dollars (Kraus & Nourjah, 1988). The sheer numbers of individuals and health care costs of MTBI in the course of a year warrant further study of symptoms and treatment programs. Early education, diagnosis, and treatment of MTBI symptoms would possibly cut the cost of treating later dysfunctional scenarios and prevent some of the emotional suffering of the individual with MTBI.

Conceptual Framework

The conceptual framework chosen for this study of individuals with MTBI was a combination of Maslow's hierarchy of needs (Maslow, 1954) and Frye's high level wellness (Frye, 1986). Maslow (1954) in his Theory of Human Motivation explained that the fulfillment of basic human needs is an ordered

progression which leads to the highest fulfillment of the human person and is the motivation for self-actualization and peak experience (Maslow, 1975). The basic needs begin with the physiological needs, progress to the safety needs, then to the belonging and love needs, which advance to the esteem needs, and finally to self-actualization (Maslow, 1954), and the need for peak experience (Maslow, 1975). Giving back control over the environment, body and mind, builds self-esteem and a sense of love and belonging (Maslow, 1954). The individual with MTBI must regain a sense of love and belonging, before self-actualization can be realized (Maslow, 1954).

Frye (1986) developed a model of indicators of "wellness seeking behavior" to assist rehabilitation nurses in the prediction of wellness outcomes and individualize learning strategies for rehabilitation clients. In Frye's (1986) model, the restoration of self-esteem to the rehabilitation client was linked to the individual's progress in the rehabilitation process. Factors that support self-esteem need to be encouraged so clients can take control over their own lives. High level wellness, optimal mental, physical, emotional, and psychosocial functioning is obtained through "wellness seeking behavior" (Frye, 1986). Frye (1986) defines "wellness seeking behavior" as a theoretically based model of behavior which includes internal source of control, level of self-confidence, and level of inner strength. The individual draws upon an internal source of control when it is believed that individual action influences the outcome. The level of

self-confidence is influenced by self-efficacy, a feeling that one is capable of a certain behavior. Inner strength and self-confidence is promoted by teaching the rehabilitation client commitment to what one is doing, belief that events are controllable, and that change is a stimulus to develop a desire for challenge (Frye, 1986).

The basic concepts of health and wellness are essential rights which allow an individual to experience self-actualization. Frye (1986) defines wellness as a holistic perspective which implies the integration of optimal mental, physical, emotional, and psychosocial functioning. Wellness is also a dynamic process in which "wellness seeking behavior" is a coordinated method of functioning in the environment, which maximizes the potential of the individual.

The ambiguous nature of the MTBI causes individuals to achieve at a lower level than pre-injury functioning. According to Maslow (1954), the individual has a desire for a stable, firmly based, high evaluation of self, achievement, competence, confidence in face of the world, independence, reputation, recognition, appreciation, and freedom. Through MTBI the esteem needs may be disrupted and the homeostasis of the human person so disturbed that self-actualization and high level wellness are impossible. The problems the individual with MTBI experiences may not be understood as having been caused by the brain injury. The decrease in functional health commonly leads to psychological sequelae, such as a decrease in the sense of

self and failure (Kay, 1986), depression (Kay, 1986; Mahon & Elger, 1989; Mandel, 1989), fear of going crazy (Kay, 1986), conditioned anxiety (Kay, 1986; Levin et al., 1987; Mattis, 1989), and psychiatric imbalance (Kay, 1986).

The individual with MTBI may have lost control and power to direct cognitive, emotional, and communicative processes (Kay, 1986). This person may think that no one believes the experience of these difficulties. Self-actualization, the desire for self-fulfillment, cannot be met because the prior satisfaction of the needs of love and esteem are not met. Loss of employment, relationships, and social support systems, and the experience of embarrassment, fear, and misunderstanding may lead to depression, and inability to function in society. MTBI may strip the individual of the dignity and strength to function, limiting the capacity to attain high level wellness (Frye, 1986) and self-actualization (Maslow, 1954).

Individuals with MTBI must be empowered through "wellness seeking behavior" to again take control to reach their maximal potential of high level wellness (Frye, 1986). The process of transformation from illness to wellness can be a life giving experience challenging the person to stop and comprehend the transcendent meaning of existence. It can be a turning point, a paradox of dying, and living in a reawakening of human consciousness. "This new 'knowledge' can be a change in attitude, valuing reality in a different way, seeing things from a new perspective, from a different centering point" (Maslow,

1975, p. 8). By grieving over loss, the process of reintegration, being reborn again, brings an understanding of the profound reality of life. This death-life experience is self-actualization (Maslow, 1954), a peak experience (Maslow, 1975). High level wellness is the dynamic integration of full mental, physical, emotional, and psychosocial functioning. Maslow (1975) challenged the health care system with the goal "to aid the person to grow to the fullest humanness, to the greatest fulfillment and actualization of his highest potentials, to his greatest possible stature" (p. 49).

Summary of Conceptual Framework and Review of Literature

According to the NHIF, 300,000 individuals suffer a MTBI each year (National Head Injury Foundation, 1986a). Between 21% (Alves et al., 1986) and 50% of these individuals (Mandel, 1989) experience sequelae that often result in serious complications. Cognitive deficits in learning, memory, planning, organization, attention, concentration (Bailey & Gudeman, 1989; Kay, 1986; Levin et al., 1987; Mattis, 1989), language, perception (Kay, 1986; Ruff et al., 1986), integration, arithmetic calculations, and sequencing (Kay, 1986), cause a decrease in overall speed, efficiency, execution, and integration of mental processes. Physical deficits such as a decrease in sensory functions, motor functions (Kay, 1986; Ruff et al., 1986), sensory-motor integration, and difficulties with dizziness, headaches, nausea, fatigue (Kay, 1986), blurred vision, insomnia, noise intolerance (Mahon & Elger, 1989), weakness, diplopia,

and hearing problems (Hinkle et al., 1986), considerably limit the individual's ability to function. Psychosocial areas of a person's vocational and private life affected by MTBI include problems in the areas of initiation, impulsivity, disinhibition, depression, lack of emotional control, isolation, and decreased insight (Kay, 1986). Historically, researchers have tried to connect MTBI symptoms with compensation and litigation (McKinlay, Brooks, & Bond, 1983). Only recently have MTBI symptoms been given credibility. Hinkle et al. (1986) and Englander et al. (1992) suggested that education about post-traumatic symptoms and provision of resources provided reassurance and support and limited reporting of symptoms.

The conceptual framework chosen for this study of individuals with MTBI was a combination of Maslow's hierarchy of needs (Maslow, 1954) and Frye's "wellness seeking behavior" (Frye, 1986). The physical, cognitive, and emotional problems of the individual with MTBI provide a dilemma for the rehabilitation clinician. The individual with MTBI often is not functioning completely and realizes that there may be a gap in achieving full potential. Through MTBI the esteem needs may be disrupted and the homeostasis of the human person so disturbed that self-actualization and high level wellness are impossible. "Wellness seeking behavior" (Frye, 1986) could empower the individual with MTBI to again take control to reach their maximal potential of high level wellness (Frye, 1986) and self-actualization (Maslow, 1954).

The question of the long-term prognosis and misdiagnosed or undiagnosed MTBI symptoms has not been answered adequately in previous long-term studies. Therefore, a study 4 years post MTBI would contribute insight to the problems of malingering, adjustment to symptoms, long-term depression, and chronic pain associated with MTBI. Understanding of symptoms could lead to interventions such as peer support groups, legal counseling, disabled student programs for MTBI, drug education, and anger and pain management groups. The individual with MTBI could achieve higher potential through these four important elements of rehabilitation: (a) rehabilitation, (b) education, (c) support, and (d) regular monitoring of progress (Gronwall, 1986).

Chapter 3

METHODOLOGY

Design

A descriptive, exploratory survey design was used to obtain the subjective complaints, rate of return to employment, and marital status of individuals with MTBI 4 years after injury. Description of subjective complaints through a telephone interview lends itself to a descriptive, exploratory survey design (Oyster, Hanten, & Llorens, 1987). Lack of MTBI research makes a convenience sample of documented cases of MTBI the most probable sample.

The 1988-1989 Study

In June of 1988 to April of 1989, in a pilot program at a northern California county hospital, individuals with MTBI admitted to the hospital for observation were provided with education in the form of a brief interview and a brochure on MTBI from the National Head Injury Foundation (1986b). Seventy-seven individuals out of 125 possible candidates were reached in person or by phone between 1 and 3 months after MTBI. Fifty-two males and 25 females were included in the sample and the median age was 26 years. Fifty-three of the injuries were due to motor vehicle accidents, 9 to falls, 9 to bicycles, and 4 to assaults. Fifty-seven stated they had no problems and 20 reported subjective complaints. Of the 77 individuals with MTBI, 68 had

returned to their former level of employment or school. Eleven of the 68 had returned to work with symptoms. Of the 9 who had not returned to work, 1 reported that other medical problems were the reason for not having returned to work, 6 had not returned to work or school due to the MTBI. An additional 2 individuals reported a decreased work or school due to the MTBI (Englander et al., 1992).

Sample/Setting

The subjects were a sample of convenience. They were clients who had been admitted to a northern California county hospital from June of 1988 to April of 1989 with a diagnosis of MTBI, and participated in an earlier study. They were eligible to participate in the earlier study if they were: (a) age 15 and over, (b) diagnosed as having traumatic brain injury (skull fracture, head injury, concussion), (c) had evidence of an alteration of level of consciousness (13-15 on the Glasgow Coma Scale) or a period of confusion/amnesia at any time postinjury, including prior to measurement in the emergency room, (d) were admitted from the emergency room to the hospital and discharged home within 3 days, (e) had no chronic substance abuse, (f) spoke English sufficiently to participate in the telephone interview, and (g) had medical insurance or Medicare coverage. In the 1988 to 1989 study, 125 clients with MTBI were contacted while in the hospital. Of the 125, 20 were excluded from the first telephone interview because they were not insured and could not be provided

with follow-up care (Englander et al., 1992). Of the 105 clients with MTBI, 77 were interviewed at 6 to 12 weeks post injury. Twenty-nine clients of the original 105 were able to be contacted in this 4 year post MTBI study. When attempting to contact these clients with MTBI, 35 had wrong numbers, 20 were not reached after trying four times at different times of day, 13 had their number discontinued with no new number, 3 had no phone, 3 were no longer at that number with no new number, one individual died, and in one case the client's wife answered and the client refused to talk because of pending litigation.

Human Subjects

Renewal of approval of the TBI project grant "A Comprehensive System of Care for Traumatic Brain Injury" was obtained from the Research and Human Review at the northern California county hospital (see Appendix A). The director of the Traumatic Brain Injury Program released the names of the MTBI subjects to the investigator (see Appendix B). Approval for the study was obtained from the San Jose State University Institutional Review Board, Human Subjects (see Appendix C). The subjects gave informed verbal consent over the telephone before the interview began. Confidentiality was strictly observed by assigning a number to each Subjective Complaint Scale. A separate list of numbers and subject names were kept by the program director.

Procedure for Data Collection

The investigator, a Rehabilitation Clinical Nurse Specialist, was able to contact and assess 29 individuals who were admitted to the medical center from June of 1988 to April of 1989 with a diagnosis of MTBI. These clients were part of the original study. The names, phone numbers, genders, and ages of the individuals in this study were released to the investigator by the director of the Traumatic Brain Injury Grant. The clients were informed by the investigator how the names used in the study were obtained, and how the information given in the interview would be used. The individuals were told that they could refuse the interview without jeopardizing their care. They were informed that the results of the survey would remain confidential, and were given telephone numbers they could call if they had any problems or questions. The interview took place on the telephone and consisted of several screening questions. If any screening questions were answered in the affirmative, 40 more specific questions were asked using the Subjective Complaint Scale.

These clients with MTBI were contacted by telephone by the Rehabilitation Clinical Nurse Specialist between December 1992 and February 1993 between the hours of 9:00 a.m. and 8:00 p.m. The subjects were assessed through a telephone survey, using The Subjective Complaint Scale and interview questions. Demographic data were obtained from the Traumatic Brain Injury Grant list of clients with MTBI.

Instrument for Data Collection

The Subjective Complaint Scale (see Appendix D) was originally designed for the 1988-1989 study by a Rehabilitation Clinical Nurse Specialist and the Traumatic Brain Injury case manager (Englander et al., 1992) from symptoms reported in the literature. It consists of several screening questions, such as, "Have you returned to work or school?", "Have you noticed any changes with your physical endurance or other physical problems?", and "Have your family members, friends, or fellow workers noticed any problems since your accident?" If any screening question is answered in the affirmative, then 40 more specific questions are asked, such as, "Since your accident, have you been more irritable?"

A five point rating scale is used as follows:

- 0 = none - no problem
- 1 = mild - no disruption of activities
- 2 = moderate - occasional disruption of activities
- 3 = severe - frequently disrupts activities
- 4 = very severe - unable to perform at work, school, or home because of the problem

The Subjective Complaint Scale was not tested for validity and reliability. The scale is used by the Traumatic Brain Injury Project to track changes over

time in subjective complaints of all individuals with traumatic brain injury who are seen in the Mild Traumatic Brain Injury Clinic.

Analysis

The subjective complaints were ranked from the most frequent to least frequent. The percentage of individuals with MTBI experiencing the complaint was listed. The mean of the severity of each complaint and percentage of the total study population reporting the complaint was presented. The present study was compared to the 1988-1989 study.

The research design for a telephone survey using The Subjective Complaint Scale lends itself to analysis by frequency distributions, measures of central tendency, and variability (Oyster et al., 1987). The research questions were represented in a tabular form as frequency distributions which summarize data ranges and describe the frequency of the data in the various classes. The results of the analysis and interpretation of the data are discussed in the next chapter.

Summary

A survey completed in 1988 to 1989 by Englander et al. (1992) provided the subjects for this study. A descriptive, exploratory telephone survey was used to obtain the subjective complaints, rate of return to employment, and marital status of individuals with MTBI 4 years after injury. Approval for the research was obtained from the regulatory boards, verbal consent was obtained

from the subjects and confidentiality was strictly observed. The Rehabilitation Clinical Nurse Specialist collected the data through telephone interviews using the Subjective Complaint Scale. The results of the study were analyzed through frequency distribution measures of central tendency and variability.

Chapter 4

ANALYSIS AND INTERPRETATION OF THE DATA

This chapter reports the results of the survey and the analysis of the data collected through the telephone interview of 29 individuals with MTBI, 4 years after injury. The results of this survey were compared to the results of the 1988-1989 survey. The differences in the subjective complaints 4 years after injury were examined in the light of subjective complaints 1-3 months after injury. In order to ascertain the changes in functional outcomes over time, marital status, return to employment, and pending litigation were also compared 4 years after injury to 1-3 months after injury.

Description of the Sample

The study completed in 1988 to 1989 by Englander et al. (1992) provided information about MTBI to newly injured clients, and surveyed individuals with MTBI about subjective complaints 6 to 12 weeks post injury. The subjects were obtained from all new admissions with a traumatic brain injury or trauma diagnosis provided each day from the admissions department of a northern California county hospital.

These subjects were selected according to the following criteria: (a) age 15 and over, (b) diagnosed as having traumatic brain injury (skull fracture, head injury, concussion), (c) had evidence of an alteration of level of consciousness

(13-15 on the Glasgow Coma Scale) or a period of confusion/amnesia at any time post-injury, including prior to emergency room measurement, (d) were admitted from the emergency room to the hospital and discharged home within 3 days, (e) had no chronic substance abuse, (f) spoke English sufficiently to participate in a telephone interview, and (g) had medical insurance or Medicare. Those clients meeting the study criteria, 77 out of 125, were contacted personally or by phone 6 to 12 weeks past hospital admission. Fifty-two males and 25 females were included in the sample. Median age was 26 years, with a range from 15 to 84 (Englander et al., 1992).

The investigator, a Rehabilitation Clinical Nurse Specialist, was able to contact by telephone and assess with the Subjective Complaint Scale 29 individuals from the original 105 subjects 4 years post the 1988 to 1989 study. These individuals were contacted a median of 4 years and 2 months post injury. When attempting to contact the 105 clients, 35 had wrong numbers, 20 were not reachable after trying at least 4 times at different times of day, 13 had their numbers discontinued with no new numbers, 3 had no phone, 3 were no longer at the listed number with no new number, 1 moved with no new number, in 1 case the client's wife answered and the client refused to talk because of pending litigation. Another client had died, leaving a total of 29 clients contacted 4 years after injury. Seventy-six were not able to be reached and the investigator was unable to obtain addresses or new numbers. The clients were

contacted during a 3 month period of time from December 1992 to February 1993. In this study the length of time after injury could account for the small number of subjects successfully contacted. Of the 29 subjects, 20 were male and 9 female. The median age was 29 years, with a range from 19 years to 86 years.

Research Question One

How many individuals with MTBI report symptoms 4 years post injury?

Seventy-nine percent ($n=23$) of the subjects answered the four screening questions with no complaints; only 21% ($n=6$) reported complaints after 4 years and completed the full The Subjective Complaint Scale. The additional 40 Subjective Complaint Scale questions were not asked if the subject answered the four screening questions with no complaints, and it was assumed that the subjects had no subjective complaints. Of the 6 who reported subjective complaints in this study, 4 were male and 2 were female. Two of the 20 males had severe health problems other than MTBI and it was not possible to attribute their complaints to MTBI.

Research Question Two

What is the severity of the symptoms of individuals with MTBI after 4 years?

The severity scale used to rate MTBI subjective complaints was taken from The Subjective Complaint Scale (Appendix D) and was designed for the

Englander et al. (1992) study from symptoms reported in the literature. It is a series of 40 questions presenting common symptoms of MTBI. The client with MTBI can rate the symptom intensity on a five point rating scale.

- 0 = none--no problem
- 1 = mild--no disruption of activities
- 2 = moderate--occasional disruption of activities
- 3 = severe--frequently disrupts activities
- 4 = very severe-- unable to perform at work, school, or home
because of the problem

The results of the study for the 6 clients' subjective complaints are summarized in Table 1.

The most common complaint reported by 5 of the 6 respondents was problems with memory at 83% with a mean severity of 1.60 with a severity range of 1.00-3.00 on a 0 to 4 scale. Anxiety and temper loss were reported by 2 subjects with a mean severity of 2.00 with a severity range of 2.00-2.00. Depression and tire easily were reported by 2 clients with a mean severity of 1.50 with a severity range of 1.00-3.00. One subject reported frustrated at a mean severity rate of 2.00, and cannot get words out and less social at a mean severity of 1.00. Another subject reported taking longer to process information at a mean severity of 1.00. Muscle weakness was reported by a subject at a mean severity of 1.00. Ringin in ears, changes in sleep, and problems with

numbers were reported by a subject at a mean severity of 2.00. One subject in this study, when asked about double vision, complained about a severe field cut with a mean severity of 3.00 as is shown in Table 1.

Table 1

Mild TBI Subjective Complaints (n=6).

Complaints	<u>n</u>	Mean Range	Mean Severity Range 0-4
Memory	5	1.60	1.00-3.00
Anxiety	2	2.00	2.00-2.00
Temper loss	2	2.00	2.00-2.00
Depressed	2	1.50	1.00-2.00
Tire easily	2	1.50	1.00-2.00
Field cut	1	3.00	3.00-3.00
Frustrated	1	2.00	2.00-2.00
Problems with numbers	1	2.00	2.00-2.00
Changes in sleep	1	2.00	2.00-2.00
Ringing in ears	1	2.00	2.00-2.00
Longer to process info	1	1.00	1.00-1.00
Cannot get words out	1	1.00	1.00-1.00
Muscle weakness	1	1.00	1.00-1.00
Less social	1	1.00	1.00-1.00

Research Question Three

Has there been a change in the employment or marital status of those individuals with MTBI who report symptoms after 4 years?

The 23 subjects who reported no complaints were off work a mean time of 2 weeks with a range from .5 to 8 weeks. The 6 subjects who reported complaints were off work a mean time of 27 weeks ranging from 64 to 8 weeks. Four of the 23 individuals without complaints did not miss any work. One individual without complaints after 4 years reported problems with attention after injury. He returned to work immediately after discharge from the hospital, but did not keep his job. Another subject without complaints dropped out of school after his MTBI and another returned to school part-time. Two individuals without complaints reported jobs that under normal conditions were prone to lay offs. Seven of 23 individuals without complaints were not working or going to school at the time of their injury; 4 individuals were retired; 1 was a housewife; and 2 were unemployed. Premorbid learning disabilities were reported in 3 cases. Of the 6 individuals with MTBI who reported symptoms, 1 was a housewife and 1 went back to school immediately, the other 4 were off work a total of 108 weeks and reported no change in their employment status. The individuals with MTBI who reported extended periods of time off work might have been covered by disability laws and could not be terminated.

Of the 6 subjects reporting subjective complaints, 2 had a change in marital status during the 4 years post injury. The 23 subjects who answered the screening questions in the negative were not asked about their marital status because that question was among the 40 subjective complaint questions. As a result of the small sample size, no observations can be made.

Research Question Four

Is there any pending litigation connected with the MTBI of individuals who report symptoms after 4 years?

In this study, 8% ($n=2$) of respondents out of 23 subjects without subjective complaints pursued litigation, whereas, 33% ($n=2$) out of the 6 subjects with subjective complaints sought litigation. Overall, 14% of the 29 subjects sought litigation. It was not determined if the litigation was the result of injuries other than MTBI, therefore, conclusions cannot be made on these outcomes. If the results of the MTBI leaves the individual dysfunctional and with a permanent disability libability is an issue, the individual with MTBI has a right to seek compensation in a court of law. In fact, cognitive difficulties could cause the individual more dysfunction than a physical disability.

Research Question Five

When the subjective complaints of this study are compared with the findings of the Englander et al. (1992) study, are there any variations?

In comparing the present study with the 1988-1989 study (Englander et al., 1992) 1-3 months after MTBI, both studies had 14 different complaints reported and 9 were common to both studies. Twenty subjects (26%) out of 77 reported subjective complaints in the Englander et al. (1992) study. In the present study, 6 subjects (21%) out of 29 reported subjective complaints. The two studies are compared in Table 2. Memory problems were the most common complaint reported by 5 out of 6 subjects in this study at a mean severity of 1.60, whereas the Englander et al. (1992) study reported memory problems by 13 out of 20 subjects with a mean severity of 1.81. Anxiety was reported by 2 subjects in this study at a mean severity of 2.00, was recounted in the 1-3 month study by 12 subjects with a mean severity of 1.67.

Temper loss was reported by 2 subjects in this study at a mean severity of 2.00, and was reported in the Englander et al. (1992) study by 9 subjects with a mean severity of 2.00. Depression was reported by 2 subjects in this study at a mean severity of 1.50, and was related by 10 subjects in the Englander et al. (1992) study. Tire more easily was reported by 2 subjects in this study at a mean severity of 1.50, whereas it was reported by 14 subjects in the Englander et al. (1992) study with a mean severity of 1.82.

Changes in sleep, frustrated, longer to process, cannot get the words out, and muscle weakness were reported only one time in this study.

Table 2

MTBI Subjective Complaints: A Comparison of the present Study with Englander et al. (1992).

Complaints	<u>n</u>		Percent of Those with Complaints Out of total population		Mean Severity (Range 0-4)	
	P	E	P	E	P	E
Memory	5	13	17	17	1.60	1.81
Anxiety	2	12	7	16	2.00	1.67
Temper	2	9	7	12	2.00	2.00
Depression	2	10	7	13	1.50	2.10
Tire easily	2	14	7	18	1.50	1.82
Changes in sleep	1	13	3	17	2.00	1.88
Frustrated	1	12	3	16	2.00	1.71
Longer to process	1	13	3	17	1.00	1.58
Cannot get words out	1	10	3	13	1.00	1.30
Muscle weakness	1	10	3	13	1.00	1.30

Note. P = This Study (n=6)

E = Englander et al. study (n=20)

In the Englander et al. study (1992), changes in sleep were described by 13 subjects at a mean severity of 1.88. Being frustrated was reported in the 1-3 month study by 12 subjects with a mean severity of 1.71. Longer to process was recounted by 13 subjects in the Englander et al. (1992) study with a mean

severity of 1.58. In the 1-3 month study, 10 subjects described the complaint of cannot get words out with a mean severity of 1.60. Muscle weakness was described in the Englander et al. (1992) study by 10 subjects with a mean severity of 1.30.

Summary

The results and analysis of a telephone interview of 29 individuals with MTBI were reported 4 years after injury. The sample size was small; 29 out of 105 potential subjects were successfully contacted.

Six out of 29 subjects reported subjective complaints after 4 years. Problems with memory were the most common subjective complaints with 5 out of 6 subjects reporting this complaint. Two subjects reported anxiety and temper loss. Tire easily and being depressed were reported by 2 subjects. One subject reported being frustrated, cannot get words out, and less social. Another subject reported taking longer to process information. Muscle weakness was reported by one subject. Ringings in ears, changes in sleep, and problems with numbers were reported by one subject.

The 23 subjects who reported no complaints were off work a mean time of 2 weeks, in comparison with the 6 subjects who had complaints and were off work a mean of 27 weeks. No observations could be made about change in marital status and MTBI because of the small sample size. Two out of 23 subjects without complaints pursued litigation, and 2 out of 6 subjects with

complaints pursued litigation. Four out of 29 subjects sought litigation from the total population.

Subjective complaints were compared with the results of the Englander et al. (1992) study. Six out of 29 subjects in this study had subjective complaints as compared with the Englander et al. (1992) study where 20 subjects out of 77 had complaints. The number and severity of complaints were lower at 4 years, but symptoms did persist. Therefore, attention and therapy must be given to the individuals who still suffer sequelae after 4 years.

Chapter 5

DISCUSSION OF FINDINGS

Introduction

This descriptive, exploratory study utilized a telephone survey to obtain subjective complaints, rate of return to employment, pending litigation, and change in marital status of individuals with MTBI 4 years after injury. This was a follow-up study of a sample surveyed in 1988-1989. In the present study of 29 subjects, 20 were male and 9 female with a median age of 29. In the 1988-1989 study, 52 males and 25 females were reported as having a median age of 26 years. Participants in this study with subjective complaints were asked about changes in marital status, employment, and pending litigation.

Research Question One

Seventy-nine percent ($n=23$) of the subjects surveyed reported no complaints; only 21% ($n=6$) reported complaints after 4 years. In the Englander et al. (1992) study, 20 subjects (26%) out of 77 subjects reported subjective complaints. Jones et al. (1992) documented the incidence of symptoms after MTBI as 21% ($n=192$), Alves et al. (1986) stated that 25% ($n=301$) of individuals diagnosed with MTBI have organic disease while Mandel (1989) reports the incidence of symptoms as high as 50%. The Englander et al. (1992) study with symptomatic MTBI at 26% ($n=20$) and the present study

which reports symptoms at 21% ($n=6$) appears to be in agreement with the literature.

Research Question Two

The present study documents the severity of the symptoms of individuals with MTBI. Problems with memory was the most common subjective complaint with 5 out of the total sample of 29 (17%) subjects reporting this complaint with a mean severity of 1.60. The Englander et al. (1992) study cited 13 out of 77 (17%) subjects complained of memory problems at a mean severity of 1.81. Alves et al. (1986) report memory problems at 21.3% out of 301 clients (total sample) at 12 months, Coloban, Dacey, Alves, Rimel, and Jane (1986) state memory disturbance at 22.1% out of 404 clients (total sample) at 3 months, and Mahon and Elger (1989) state that 15% of the subjects ($n=67$) complain of memory problems at 6 months. The mean severity rate was not reported in any of these studies. When compared with a control group ($n=20$) in the Dikmen, McLean, and Temkin (1986) study, memory problems were reported by only 5% of the population. The findings for problems with memory in this study were close to those studies cited in the literature. When this study was compared to the Englander et al. (1989) study, there was no change in problems with memory over time.

This study indicates that memory problems are the most significant consequences of MTBI. Seventeen percent (5 out of 29) stated that they had

problems with memory with a mean severity of 1.60. With a supportive environment the individual with memory problems can acknowledge the difficulty and seek external structure and tools to compensate. The basic esteem need is satisfied and the individual with MTBI can seek self-actualization through "wellness seeking behavior" (Frye, 1984). The individual must develop an internal center of control rather than believing that external forces determine the individual's outcome.

Anxiety and temper loss were expressed by 2 subjects out of 6 symptomatic subjects in the present study with a mean severity of 2.00. In the Englander et al. (1992) study, 12 subjects (60%) out of 20 symptomatic subjects reported anxiety at a mean severity of 1.67 and temper loss was reported by 9 subjects at a mean severity of 2.00.

In a study by Dikmen et al. (1986) 1 month after injury, 10 out of 20 clients reported anxiety with 8 of the control group (uninjured subjects matched for age, education, and sex) reporting anxiety. Irritability was reported by 14 subjects out of 20 in the Dikmen et al. (1986) study with 8 in the control group reporting irritability as a problem. Fourteen out of 20 subjects in the Dikmen et al. (1986) study report loss of temper easily with 5 reporting it in the control group. In this study, 2 out of 29 and 9 out of 77 in the Englander et al. (1992) study reported loss of temper as a problem. Twelve out of 20 subjects reported problems with anxiety in the Englander et al. (1992) study at 6 to 12

weeks post injury with the Dikmen et al. (1986) study reporting 10 out of 20 subjects having problems with anxiety at 1 month. Eight subjects in the control group in the Dikmen et al. (1986) study reported problems with anxiety. Dikmen et al. (1986) reported that by 1 year after injury the MTBI group and the control group were not different from one another. The findings for anxiety and temper loss in this study show a decrease when compared to the findings of other studies and the Englander et al. (1989) study. When compared to the Dikmen et al. (1986) study control group who report anxiety at 40% and temper loss at 25% and no change in the study and control group after 1 year, this study indicates that these complaints decrease over time.

Depression was reported by 2 subjects in the present study at a mean severity of 1.50. The Englander et al. (1992) study reported that 10 subjects had problems with depression with a mean severity of 2.10. Most studies do not ask about depression as a subjective complaint because many variables could contribute to depression. Self-confidence and self-efficacy may be promoted through education of the individual with MTBI in appropriate ways to express anger and relieve anxiety and depression. Esteem is increased both within oneself and from without and the individual's potential is maximized to the fullest potential (Maslow, 1954).

In the present study, tire easily was reported by 2 subjects at a mean severity of 1.50, and the Englander et al. (1992) study reported tire easily at a

mean severity of 1.82. In a study of 20 clients, 14 reported fatigue 1 month after injury with 8 subjects from the control group reporting fatigue (Dikmen, 1986), Mahon and Elger (1989) declared that 27 clients out of 67 clients complained of fatigue at 6 months. Inferences can be made that tire easily is a complaint seen early in the individual with MTBI, and that 40% of the general population complain of fatigue and that fatigue decreased over time.

In the present study, one subject reported frustrated at a mean severity of 2.00 and cannot get words out and less social at a mean severity of 1.00. Another subject reported taking longer to process information at a mean severity of 1.00. Muscle weakness was reported by a subject at a mean severity of 1.00. ringing in ears, changes in sleep, and problems with numbers were reported by a subject at a mean severity of 2.00. Each of these subjective complaints were reported only one time, therefore no comparisons or outcomes can be made. Although there were fewer complaints at 4 years, there was no statistically significant difference in the number of complaints reported at 4 years in the present study and the Englander et al. (1992) study at 1-3 months post injury.

Research Question Three

The 23 subjects, in this study, who reported no complaints were off work a mean time of 2 weeks. The 6 subjects who reported complaints were off work a mean of 27 weeks. The financial loss, the loss of identity with the work

place, the change in routine, and the need for dependency are stressors that compound any subjective complaints and are often overlooked by health care professionals. Self-esteem is lost and personal identity upset. A strong internal center of control can influence outcomes (Frye, 1984) and direct the person to "wellness seeking behavior" (Frye, 1984) and increase esteem (Maslow, 1954).

Two of the 6 individuals with MTBI and subjective complaints had a change in marital status following MTBI. Since questions about the state and quality of the relationship before MTBI were not asked, it is hard to link the MTBI with the change in marital status. The break up of a relationship is difficult under normal circumstances, but can be devastating when it is thought to be brought on by the MTBI. The broken esteem of the individual with MTBI may be rebuilt by restoring internal control (Frye, 1984) and thereby freeing the person for self-actualization (Maslow, 1954).

Research Question Four

In this study, 2 out of 23 subjects of respondents without subjective complaints pursued litigation, whereas 2 out of 6 subjects with complaints sought litigation. Pending litigation can increase the stress level of the individual with MTBI. It may intensify other complaints such as depression or anxiety. Two out of the 6 subjects with complaints were involved in pending litigation. These individuals will have conclusion to their litigation process when they have their day in court, but it will take a level of inner strength to be able to survive

the MTBI and emotional injury and be healed. In the face of being accused of fabricating symptoms by lawyers, physicians, employers, and at times family members, the individual with MTBI will have the inner self shaken. Rebuilding the internal center of control (Frye, 1984) is even more important in such a case because self-esteem is so damaged.

Research Question Five

Subjective complaints in this study were compared with the results of the Englander et al. (1992) study. Six of the subjects out of 29 in this study had subjective complaints as compared with the Englander et al. (1992) study 20 out of 77 had complaints. Both studies had 14 different complaints reported and 9 were common to both studies. Memory was the most common complaint reported by 5 out of 29 subjects in this study with a mean severity of 1.60, whereas in the Englander et al. (1992) study 13 subjects out of 20 reported memory problems with a mean severity of 1.81. Anxiety reported by 2 out of 29 in this study at a mean severity of 2.00, was recounted by 9 subjects in the Englander et al. (1992) study with a mean severity of 2.00. Depression was reported by 2 subjects at a mean severity of 1.50. In the 1-3 month study, depression was reported by 10 subjects with a mean severity of 2.10. Tire more easily was reported by 2 out of 29 subjects in this study, whereas 14 subjects out of 77 in the Englander et al. (1992) study reported memory problems at a mean severity of 1.50. Changes in sleep, frustrated, longer to

process, cannot get the words out, and muscle weakness were reported only one time in this study and therefore, because of the small number, were not compared to the Englander et al. (1992) study.

Research Questions Related to Conceptual Framework

Frye's "wellness seeking behavior" and Maslow's hierarchy of needs provided the framework for this study. Frye (1986) proposed that individuals must be empowered through "wellness seeking behavior" to again take control over their being, in order to reach their maximal potential of high level wellness. According to Maslow (1954), an individual must experience esteem, a sense of love and belonging before self-actualization can be realized. Individuals experiencing sequelae of MTBI have a right to function to their fullest potential and experience high level wellness (Frye, 1986) and self-actualization (Maslow, 1954). This investigation identifies the problems connected with MTBI 4 years after injury so that the dynamic process of wellness maximizes the potential of which the individual is capable (Frye, 1986).

When an individual experiences a MTBI, a profound loss of control (Frye, 1984) is felt and the basic human needs of physiological balance, safety, belonging, and esteem need to be reinstituted (Maslow, 1954). As each of these needs are satisfied control is given back to the individual and homeostasis is reestablished so that the integration of optimal mental, physical,

emotional, and psychosocial functioning can be satisfied through "wellness seeking behavior" (Frye, 1984).

Limitations

Descriptive research by its nature is limited to examination of frequency distributions, central tendency, and variability (Oyster et al., 1987). The survey format can effect weak validity because of the approximate indicators, but increases the reliability by presenting all subjects with the standardized stimulus, The Subjective Complaint Scale. This study was not intended to explain relationships, test hypotheses, make predictions, or get at meanings and implications (Oyster et al., 1987). External validity is limited by number of subjects (29), ethnicity (English speaking), financial status (upper to middle class), and geographical area (county hospital in northern California).

An attempt to contact all of the 105 subjects in the 1988 to 1989 study (Englander et al., 1992) was made, but because of changes in phone numbers and addresses, only 29 were contacted by phone. This small sample size limits generalization of the study. Subjects were from only one county hospital trauma center, therefore, generalization to other parts of the United States is limited. The original study included only insured subjects, those with insurance and/or Medicare. Clients with a health maintenance organization or the non-insured were not included in the original study since follow-up services could not be offered. Clients with symptoms who had Medi-Cal or no insurance

could not obtain neuropsychological evaluations and some forms of therapy, therefore were referred to a Brain Injury Clinic different from the special Mild Brain Injury Clinic. In the Englander et al. (1992) study, all subjects with complaints were referred to the Mild Brain Injury Clinic for follow-up care. By including only insured subjects, the social-economic focus of this study was limited to the upper and middle class. The study was also limited by ethnicity. All subjects spoke English sufficiently to participate in a telephone conversation.

The current study was limited by the sample size. Out of 105 subjects, 30 (28%) (one refused because of pending litigation) were able to be contacted by phone. Of these 29, only 6 subjects reported complaints in the areas of memory, anxiety, temper loss, depressed, tire easily, field cut, frustrated, problems with numbers, changes in sleep, ringing in ears, longer to process info, cannot get words out, muscle weakness, and less social (see Table 1, page 35).

Conclusions and Recommendations

This study concludes that 6 out of 29 individuals with MTBI report the major symptoms of memory problems, anxiety, loss of temper control, depression, and fatigue 4 years after injury. The present study seems to indicate that MTBI improves with time, but this could be due to chance or the small number of subjects. Complaints about problems with memory seem to remain the same over time (17%) with 5 out of 29 in this study and 13 out of 77

in the 3 month study reporting memory problems, while decreasing from 1.81 to 1.60 in mean severity. Alves et al. (1986) report memory problems at 21.3% and Coloban et al. (1986) report 22.1%.

Depression decreased with time from 13% with 10 out of 77 subjects reporting at 1-3 months in the Englander et al. (1992) study to 7% with 2 out of 29 subjects reporting in the present study 4 years post injury. Depression also decreased in mean severity from 2.10 to 1.50.

Anxiety decreased in 4 years from 16% with 12 out of 77 subjects reporting problems in the Englander et al. (1992) study to 7% with 2 out of 29 subjects reporting problems in the present study. Temper loss decreased over time from 12% with 9 out of 77 reporting problems at 1 to 3 months to 7% with 2 out of 29 reporting problems at 4 years with a mean severity of 2.00 in both studies.

Several studies do not mention anxiety, temper loss, and depression as symptoms of MTBI (Alves et al., 1986; Coloban et al., 1986; Mahon & Elger, 1989; Mandel, 1989). Maybe the question was not asked because anxiety, temper loss, and depression may be attributed to causes other than MTBI. Most MTBI studies cited in literature focus on physical and cognitive symptoms.

Depression and tire easily were reported by 2 out of 29 individuals with MTBI with a mean severity of 1.50. Depression, tire easily, and anxiety are closely linked to the psychological sequelae that Kay (1986) stated as the most

serious of scenarios, psychiatric imbalance, the final ultimate blow to a person with MTBI. Restoration of self-esteem is linked as a basic human need to the total rehabilitation process. The recovery and adaptation process enhances self-esteem and encourages clients to take control over their own lives and develop "wellness seeking behavior" (Frye, 1984).

Recommendations for Nursing

Nursing has a key part to play in the evaluation, education, referral, and treatment of individuals with MTBI. In the acute hospital setting the nurse spends the most time with the individual who is admitted for 24 hours observation after a MTBI. The medical doctor or neurosurgeon is interested in the physical functioning and the general orientation of the individual with MTBI and sometimes misses subtle cognitive difficulties. Nurses who work with trauma patients in the emergency room or the acute hospital should assess all individuals who have had any alteration in consciousness with an orientation test to screen for post traumatic amnesia. Nurses should educate all individuals who have had an alteration in consciousness in the possibilities of MTBI sequelae. Written information about the possible consequences of MTBI and referral numbers should be given to the patient at the time of discharge.

Nurses have an important role in educating the public in prevention of accidents which cause MTBI. Nurses could work to assist in the passage of

legislation for safety devices such as bicycle helmets and consumer safety in manufactured products such as automobiles.

Nurses who specialize in rehabilitation should educate other health, law enforcement, counseling, and teaching professionals in the symptoms of MTBI and where help for individuals with MTBI can be obtained. Nursing case managers in workers compensation and the insurance industry should be able to recognize the symptoms of MTBI and refer the individual for testing and treatment.

Peer support groups for individuals with MTBI can best be facilitated by a nurse who has a background in rehabilitation or neuroscience nursing and experience in psychosocial issues and case management. Nurses can play a major role in the research of the assessment, education, and treatment of individuals with MTBI.

This investigation is a basis for further study in view of the fact that 6 out of 29 individuals with MTBI complained of symptoms after 4 years. A longer, longitudinal, multi-center study needs to be initiated to determine incidence and prevalence of the complaints of individuals with MTBI over time. A study where individuals with MTBI are compared to uninjured individuals may document the incidence of anxiety, temper, and depression in the general population and relate them to incidence in the MTBI population.

Based on the findings of this study, the following recommendations are made. The study should be replicated with a larger and more ethnically, financially, and geographically varied sample to increase external validity and each subject should be asked: (a) a shortened version of the 40 question Subjective Complaint Scale with the 4 screening questions forfeited or the use of a standardized tool; (b) if there was a change in their marital status since the injury; and (c) if the litigation they were pursuing was related to the MTBI.

An intervention study should be conducted to determine the effect of interventions on the number and severity of subjective complaints. Possible interventions are: (a) education of health care and service professionals, such as, medical doctors, police, psychologists, drug, school, and rehabilitation counselors, and therapists; (b) evaluation and education of those with an alteration of consciousness resulting from trauma; (c) written information about symptoms of MTBI and referral numbers to be given to all who suffer an alteration of consciousness resulting from trauma; (d) peer support groups; (e) case management to assist the individual with MTBI in accessing agencies providing services; and (f) outpatient clinics which specialize in evaluation and treatment of MTBI.

Summary

The purpose of this descriptive study was to collect and evaluate information that describes MTBI 4 years after injury. Data were collected on

subjective complaints, return to employment, marital status, and pending litigation. The study concluded that of the individuals with MTBI interviewed, problems with memory was most commonly cited. Anxiety, temper, and depression were not usually mentioned in the literature and along with tire easily were the second most common sequelae mentioned in this study. Individuals with MTBI who report symptoms have a pending litigation rate of 33% ($n=2$) out of 6 subjects, whereas those without complaints have a rate of 8% ($n=2$) out of 29 subjects. No changes in employment status was reported by the clients with MTBI but they were off work a mean time of 27 weeks. Even though the sample size was small, 6 out of 29 report subjective complaints after 4 years.

Frye's (1984) "wellness seeking behavior" and Maslow's (1954) hierarchy of needs provided the framework for this study. Individuals experiencing sequelae of MTBI have a right to function to their fullest potential and experience high level wellness (Frye, 1984) and self-actualization (Maslow, 1954). Six out of 29 individuals reported the subjective complaints of problems with memory, anxiety, temper, depression, and tire easily. Two of these individuals had their lives disrupted by pending litigation and changes in employment and marital status. If these individuals through Frye's (1986) "wellness seeking behavior" are encouraged to take control over their lives and progress through Maslow's (1954) hierarchy of needs, then self-actualization and high level wellness would be experienced. Based on the findings of this

study, the study should be replicated with a larger and more ethnically, financially, and geographically varied sample and with changes in the subjective complaint and interview questions. Intervention studies should be conducted to determine the effect of interventions on the number and severity of subjective complaints.

The long-term consequences suffered by individuals with MTBI has implications for nursing practice in the evaluation, education, referral, and the treatment of individuals with MTBI. In the acute hospital and the Emergency Room, the nurse plays a major role in the evaluation and education of the trauma victim. Education of the public in accident prevention and advocacy in safety legislation are areas of nursing concern. Nursing Case Managers can recognize the symptoms of MTBI and refer the individual for testing and treatment. Rehabilitation and neuroscience nurses are resources for the education of other professionals and facilitators of Peer Support Groups for individuals with MTBI. Nursing research in the assessment, education, and treatment of individuals with MTBI identifies individuals at risk, decreases anxiety, and length of recovery, while increasing self-esteem and the possibility of self-actualization (Maslow, 1954).

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APPENDIXES

APPENDIX A

Approval From Hospital Review Board

July 24, 1992

RE: Project entitled "A Comprehensive System of Care for Traumatic Brain Injury"

On July 24, 1992, the Research and Human Subjects Review Committee
approved continuation of the above project.

Approval is granted with the understanding that no changes will be made in the protocol or approved consent form without the knowledge and prior approval of the Committee. Please be advised that all problems having to do with subject safety must be reported to the Committee within five (5) working days.

The approval number assigned to this project is 7/24/92-04. In correspondence concerning this project, it would be helpful if you would refer to this number.

If this project is to continue beyond the expiration date of July 23, 1993, it must be renewed in accordance with the Committee's renewal instructions. As a courtesy reminder, a renewal application will be mailed to you approximately one month prior to the expiration date. Failure to submit an update within 30 days following the due date will result in termination of your approval. If the project is terminated or completed prior to the expiration date, you should immediately notify the Committee in writing.

Should you have any questions, please contact the Administrator of the Committee,

Sincerely,

Research and Human Subjects Review Committee

EAM/cg

②

APPENDIX B
Release of Subject Names

April 30, 1992

Sarra Chaffin

Dear Ms. Chaffin:

I am writing to release to you the names of mild brain injured individuals who were hospitalized at between June, 1988 and June, 1989. These individuals have been previously contacted for their verbal consent via the phone to do a follow up study of symptoms after minor traumatic brain injury. The response of that study was so positive that the editors of the Brain Injury Journal strongly suggested a three year follow up study.

I am highly supportive of your Master's thesis project. If I can be helpful to you or to any of your committees at San Jose State University, please let me know.

Sincerely,

Associate Chief
Physical Medicine and Rehabilitation

JE/bg

APPENDIX C

**Approval From San Jose State University
Institutional Review Board Human Subjects**

Office of the Academic Vice President • Associate Academic Vice President • Graduate Studies and Research
One Washington Square • San Jose, California 95192-0025 • 408/924-2480

To: Sarra Chaffin

From: Serena W. Stanford *Serena W. Stanford*
AAVP, Graduate Studies and Research

Date: September 24, 1992

The Human Subjects-Institutional Review Board has approved your request to use human subjects in the study entitled:

"Mild traumatic brain injury in an insured
population: Subjective complaints and return to
employment: A three year study"

This approval is contingent upon the subjects participating in your research project being appropriately protected from risk. This includes the protection of the anonymity of the subjects' identity when they participate in your research project, and with regard to any and all data that may be collected from the subjects. The Board's approval includes continued monitoring of your research by the Board to assure that the subjects are being adequately and properly protected from such risks. If at any time a subject becomes injured or complains of injury, you must notify Dr. Serena Stanford immediately. Injury includes but is not limited to bodily harm, psychological trauma and release of potentially damaging personal information.

Please also be advised that each subject needs to be fully informed and aware that their participation in your research project is voluntary, and that he or she may withdraw from the project at any time. Further, a subject's participation, refusal to participate or withdrawal will not affect any services the subject is receiving or will receive at the institution in which the research is being conducted.

If you have questions, please contact me at 408-924-2480.

CC: Ann Doordan

APPENDIX D
Subjective Complaint Scale

MILD TRAUMATIC BRAIN INJURY PROGRAM (MTBI)
SUBJECTIVE COMPLAINT SCALE (SCS) INSTRUCTIONS

The Subjective Complaint Scale need not be given in its entirety if the individual states there are no problems. An initial screening statement follows:

Since your injury and admission at _____ (if applicable):

1. _____ Have you returned to work/school?
2. _____ When did you return-to-work?
3. _____ Have there been changes in your employment status?
4. _____ Are you working the same hours per week as before your injury?
5. _____ Have you lost jobs?
6. _____ How many months in the last 12 were you employed?

Have you noticed any changes in:

- _____ Your physical endurance or other physical problems?
- _____ Your ability to think or remember?
- _____ Your work or school performance?
- _____ Getting along with friends or family?"

We have found that family members or fellow workers/students sometimes notice problems. Has anyone mentioned anything to you regarding changes since the accident?" _____ Yes _____ No

Any other problems/changes since your injury?" _____ Yes _____ No

Did you pursue litigation? _____ Yes _____ No

If so, did it relate to Workers Comp., Personal Injury, Victim Assistance (Circle one)

If any of the answers to the above are YES, complete the Subjective Complaint Scale (SCS).

Patient Name: _____
 DOI: _____
 Date of Survey: _____
 Survey Contact: _____

Mild Traumatic Brain Injury Program

Patient: _____

Date: _____

SUBJECTIVE COMPLAINT SCALE (SCS)

RATING SCALE:

- 0= None
1= Mild: No disruption of activities
2= Moderate: Occasional disruption of activities
3= Severe: Frequently disrupts activities
4= Very Severe: Unable to perform at work, school, or home because of the disturb.

Since your brain injury:	None	Mild	Moderate	Severe	Very Severe
1. Are you experiencing more headaches?	☐	☐	☐	☐	☐
Comments: _____					
2. Do you tire more easily?	☐	☐	☐	☐	☐
Comments: _____					
3. Do you experience any new muscle weakness?	☐	☐	☐	☐	☐
Comments: _____					
4. Do you experience dizziness?	☐	☐	☐	☐	☐
Comments: _____					
5. Do you have ringing in your ears?	☐	☐	☐	☐	☐
Comments: _____					
6. Are you having any blurred vision?	☐	☐	☐	☐	☐
Comments: _____					

	None	Mild	Moderate	Severe	Very Severe
7. Are you experiencing double vision?	☐	☐	☐	☐	☐
Comments: _____					
8. Are you having problems with your hearing?	☐	☐	☐	☐	☐
Comments: _____					
9. Does noise bother you more?	☐	☐	☐	☐	☐
Comments: _____					
10. Are you having any changes in your sleep pattern?	☐	☐	☐	☐	☐
Comments: _____					
11. Are you having problems with your coordination like loss of balance, writing or working with tools?	☐	☐	☐	☐	☐
Comments: _____					
12. Are you experiencing an increase or decrease in appetite?	☐	☐	☐	☐	☐
Comments: _____					
13. Have you had a seizure?	☐	☐	☐	☐	☐
Comments: _____					
14. Have you had any muscle twitching?	☐	☐	☐	☐	☐
Comments: _____					

	None	Mild	Moderate	Severe	Very Severe
15. Have you noticed any new allergies?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
16. Have you experienced any nausea or vomiting?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
17. Have you experienced any change in your sense of taste?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
18. Have you experienced any change in your sense of smell?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
19. When you drink do you find that you are less able to tolerate the effects of alcohol?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
20. Do you experience any problems with your memory?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
21. Are you having problems learning new information, skills or tasks?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
22. Does it take you longer to process information, solve a problem, write a paper or letter?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					

	None	Mild	Moderate	Severe	Very Severe
23. Are you having problems with reading? Comments: _____	☐	☐	☐	☐	☐
24. Are you having problems writing? Comments: _____	☐	☐	☐	☐	☐
25. Are you having more problems with spelling? Comments: _____	☐	☐	☐	☐	☐
26. Do you have words on the tip of your tongue and just cannot get them out? Comments: _____	☐	☐	☐	☐	☐
27. Do you have problems with numbers? Comments: _____	☐	☐	☐	☐	☐
28. Has anyone noticed you daydreaming more? Comments: _____	☐	☐	☐	☐	☐
29. Do you become upset or frustrated more easily? Comments: _____	☐	☐	☐	☐	☐
30. Does family/friends/co-workers say you are more irritable? Comments: _____	☐	☐	☐	☐	☐

	None	Mild	Moderate	Severe	Very Severe
31. Are you having more difficulty keeping your house and/or yard maintained?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
32. Are you less involved in social activities?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
33. Are you less involved in sport or recreational activities?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
34. Are you having new problems getting along with your spouse/family/friends or co-workers?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
35. Have you been depressed?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
36. Do you lose your temper more easily?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					
37. Are you more anxious?	☐	☐	☐	☐	☐
<i>Comments:</i> _____					

*****

38. Has your employment status changed?_____

*If so, in what way?*_____

39. What was your marital status pre-injury?_____

*What is your marital status now?*_____

40. Was there a lawsuit regarding your head injury?_____

*If yes, has it been resolved?*_____ *Date*_____*If yes, was there an award?*_____

_____