

Marital stability after brain injury: An investigation and analysis

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Abstract. *Objective:* To examine rates of separation and divorce after traumatic brain injury and identify factors relating to risk of marital breakdown.

Participants: 120 persons who sustained a mild, moderate, or severe traumatic brain injury and who were married at the time of injury.

Methods: Survivors were contacted between 30 and 96 months postinjury when demographic and marital status information was solicited. Injury information was obtained from medical records.

Findings: A majority of patients remained married. The rate of divorce was 17% and 8% was the separation rate. People who were married longer before their injury, victims of non-violent injuries, older persons, and persons with less severe injuries were more likely to remain married. Gender, ethnicity, educational level, time elapsed since injury, and postinjury employment status were unrelated to risk for marital breakdown.

Conclusion: Research findings do not support contentions that persons with brain injury are at greater risk for divorce relative to the general population. Nor do findings suggest that males are more likely to leave injured female partners. More research is needed to assess marital quality and the potential benefits of intervention programs designed to develop and maintain mutually supportive relationships.

Keywords: Brain injury, marriage, divorce

1. Introduction

Marriage is highly valued in most societies and a number of investigators have reported that relationships are strained after traumatic brain injury (TBI) [4, 12, 19]. Yet, few researchers have studied marital status changes after TBI. For example, Wood and Yurdakul [24] examined the frequency of relationship breakdowns looking at risk factors including gender, time since injury, injury severity, and duration of relationship. Their investigation included 131 adults, averaging eight years postinjury, who were married or living with their partner for at least one year prior to injury. Nearly half of the relationships broke down, with separations far

more common than divorce. Relationship stability was related to two factors, length of relationship and time since injury. Couples who were married for longer periods of time were more likely to sustain their marriages postinjury. The authors also concluded that marriages were especially susceptible to dissolution between five and six years postinjury.

Wood and Yurdakul provided evidence that divorce rates after TBI are much lower than rates for the general population. They reported a 15% divorce rate for their sample comprised of persons averaging 43 years old. Citing 1995 national statistics, the researchers reported a 38% divorce rate in the United Kingdom among persons younger than 35. A more pessimistic view of marital stability emerges from a report by Webster et al. [21]. Their commentary paper described a national survey of marital status changes after brain injury in the United Kingdom, revealing a 30% failure rate after seven years [16]. The authors contrasted data from the

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brain injury sample with 1997 general population survey results. Substantially lower failure rates of 14–18% after seven years for uninjured persons were identified.

Other, less formal, studies have provided information on divorce and separation rates in the TBI population and suggested alarmingly high rates of marital dissolution. Panting and Merry [11] were among the first to voice concern. Reporting on ten couples, they found that 40% of marriages ended in divorce or separation within seven years of injury. Thomsen's [19] longitudinal outcome study of severe TBI revealed a higher divorce rate. Of the nine couples who were married at the start of the study, only two (22%) remained together after 15 years. Tate and colleagues [17] reported a divorce rate of 54% in a sample of 31 survivors of severe TBI, with an average of 6 years postinjury. In a more recent study of persons with serious head trauma by Wood, Lioffi, and Wood [23], 23 (48%) of 48 couples were divorced or separated within six years of injury.

Several researchers have attempted to identify factors relating to marital stability. Anderson-Parenté and colleagues [1] examined the reasons couples choose to stay together following TBI. Of the 23 married couples with one partner sustaining a TBI, only ten (43%) remained together following injury. The researchers found that age was related to marital stability where older spouses tend to choose to stay in the marriage. Severity of injury was not a significant factor in their study. Vanderploeg and colleagues [20] investigated predictors of marital status after mild TBI in a veterans' population. The authors did not provide information about veterans' preinjury marital status. Their findings suggested that age, race, pre-existing psychiatric factors, and employment were related to marital status. Intact relationships were seen in non-substance abusing, older, white veterans who were working full-time.

In summary, few investigators have focused their research exclusively on changes in marital status subsequent to brain injury. A review of the literature yields equivocal findings. Divorce estimates after brain injury have ranged from 15% [24] to 54% [17]. Investigators have identified factors that relate to the likelihood of marital stability, including duration of relationship prior to injury and time elapsed since injury. Uncertainties remain about the influence of other factors including injury severity, etiology, and gender.

Wood and Yurdakul published the only study focused on marital stability after brain injury. A primary purpose of the present study was to replicate and extend their investigation using an American sample. Specifically, the relationship between injury factors (e.g., dura-

Table 1
Demographic Characteristics of the Sample ($n = 120$)

| Variable | Percentage Married $n = 90$ | Percentage Separated/ Divorced $n = 30$ |
|------------------------------|--------------------------------|--|
| <i>Gender</i> | | |
| Male | 70 | 63 |
| <i>Ethnicity</i> | | |
| Caucasian | 80 | 59 |
| African American | 17 | 34 |
| Other | 3 | 7 |
| <i>Education</i> | | |
| Less than high school | 31 | 33 |
| High school graduate | 27 | 37 |
| Attended college | 42 | 30 |
| <i>Employment Postinjury</i> | | |
| Employed | 57 | 41 |
| Unemployed | 36 | 53 |
| Retired | 7 | 6 |

tion of unconsciousness, etiology), demographics, and relationship factors (e.g., duration of marriage prior to injury) were examined. Based on Wood and Yurdakul's investigation, we anticipated that patients in shorter marriages before their injury would be less likely to sustain their marriages postinjury. We also anticipated that older patients would be more likely to sustain their marriages.

2. Method

2.1. Participants

Participants consisted of 122 consecutively admitted individuals, at least 19 years of age, married at the time of their injury, and completing a follow-up evaluation between 2.5 and 8 years postinjury. Of the 122 participants, two were excluded from analyses because they were widowed at the time of follow-up. All participants sustained a TBI, defined as damage to brain tissue caused by an external mechanical force, as evidenced by loss of consciousness due to head trauma, posttraumatic amnesia, skull fracture, or objective neurological findings. Consent was obtained from the participant or their legal guardian as appropriate. Recruitment was completed at an outpatient rehabilitation clinic affiliated with an urban level I trauma center. Fifty-three percent of the sample were admitted to other hospitals and later referred for outpatient services by physicians. The remaining 47% were directly admitted to the medical center and referred for follow-up after discharge.

The two referral groups were examined to ascertain the comparability of socio-demographic characteristics. Strong similarities were revealed in regard

Table 2
Injury Characteristics of the Sample ($n = 120$)

| Variable | Percentage Married $n = 90$ | Percentage Separated/Divorced $n = 30$ |
|-----------------------------------|-----------------------------------|--|
| <i>Cause of Injury*</i> | | |
| Non-violent | 93 | 76 |
| Violent | 7 | 24 |
| <i>Admission GCS Score</i> | | |
| GCS 3–8 | 56 | 59 |
| GCS 9–12 | 19 | 35 |
| GCS 13–15 | 25 | 6 |
| <i>Length of Unconsciousness*</i> | | |
| None | 39 | 22 |
| 1–2 days | 31 | 15 |
| 3–14 days | 19 | 41 |
| > 14 days | 11 | 22 |

*Significant differences at the $p < 0.05$ level.

to age, ethnicity, and cause of injury. However, the outside referral group had significantly more females (40% vs. 23%, $X^2 = 4.13$; $df = 1$, $p = 0.042$) and a higher level of education (80% vs. 54% graduated from high school, $X^2 = 9.97$; $df = 2$, $p = 0.007$).

2.2. Instruments

Information regarding participant's medical history was obtained via interview and medical records review. All other data was collected via the General Health and History Questionnaire (GHHQ) [8]. The GHHQ was developed specifically to assess the psychosocial, vocational, and neurobehavioral status of patients with varying ethnic backgrounds and varying levels of injury severity. Several investigations have provided support for the questionnaire's validity and interrater reliability [9,10,14]. Respondents are queried about pre- and postinjury demographics, substance use and abuse, education, vocational status, history of psychiatric or psychological treatment, and criminal history.

2.3. Procedure

The General Health and History Questionnaire was mailed to participants prior to their scheduled physical and/or neuropsychological examination. Upon arrival for evaluation, responses to the questionnaire were reviewed for accuracy and completeness. Respondents were asked to clarify or provide additional information when necessary, and informed consent was obtained for inclusion of data in our research database. Injury severity information was collected from medical record review and included: etiology of TBI, admission Glasgow Coma Scale (GCS) score, duration of unconscious-

ness (defined as time to follow verbal commands after injury), and duration of post-traumatic amnesia (PTA, defined by two consecutive Galveston Orientation and Amnesia Test scores above 75).

2.4. Data analysis

All statistical calculations were performed using SPSS for Windows, version 12.0. Descriptive statistics were computed for demographic variables. To explore group differences, comparisons were made between individuals who remained married and those that were separated or divorced at follow-up. Comparisons among categorical variables were made using Chi-square analyses. For continuous variables, group comparisons were made using one-way analyses of variance (ANOVA).

3. Results

3.1. Overall demographics

The average age at time of injury for the sample was 41 years ($S.D. = 12.5$) with a range of 19 to 69. Of the sample, 68% were male. Most participants were Caucasian (74%) with approximately one-fifth African American. The majority of the sample (68%) had graduated from high school. Approximately half (53%) of participants were working at the time of the evaluation, whereas 40% were unemployed and 7% were retired.

Injury characteristics of the sample were also examined. The average time since TBI was 49 months ($S.D. = 17$) with a range of 30 to 96 months postinjury. Motor vehicle accidents accounted for the majority of injuries (70%). The proportion of injuries attributed to violence or assault was 11%. GCS classification of injury severity was based on criteria established by Teasdale and Jennett [18] with scores of 13 to 15 considered mild, 9 to 12 moderate, and 3 to 8 severe. Emergency Department admission GCS scores were unavailable for 47% of the sample. For participants whose GCS was known, most fell in the severe range (57%) with 20% sustaining mild and 23% sustaining moderate injuries. Information pertaining to duration of unconsciousness was obtained for 90% of the sample. For those sustaining loss of consciousness (65%), the mean duration was 10.1 days ($S.D. = 29.2$). Information on PTA was available for only 45% of the sample. For this reason, analyses were not computed for PTA data.

Table 3
Length of Relationship Preinjury, Age at Injury, and Time Postinjury (means with standard deviations in parentheses)

| | Married <i>n</i> = 90 | Separated/ Divorced <i>n</i> = 30 | Total <i>n</i> = 120 |
|---------------------------------|--------------------------|--------------------------------------|-------------------------|
| Length of relationship (years)* | 16.5 (11.77) | 5.6 (5.69) | 14.5 (11.68) |
| Age (years)* | 43.2 (12.8) | 33.6 (8.40) | 40.8 (12.52) |
| Time postinjury (years) | 4.0 (1.41) | 4.4 (1.31) | 4.1 (1.39) |

*Significant differences at the $p < 0.05$ level.

3.2. Postinjury marital status

Of our sample, 75% remained married at the time of their follow-up evaluation. Seventeen percent had divorced and 8% were separated. A series of Chi Squares (see Tables 1 and 2) and ANOVAs (see Table 3) were calculated to identify between-group differences for persons who remained married and those who were separated or divorced at the time of evaluation.

No significant differences were noted between males and females with regard to separation or divorce rate. Ethnicity, level of education, postinjury employment status, and time postinjury were all unrelated to incidence of separation or divorce.

A relationship was found between age at injury and postinjury marital status ($F_{1,119} = 14.75, p < 0.001$). As shown in Fig. 1, older subjects were far less likely to be divorced or separated. Married individuals were, on average, 10 years older than those who separated or divorced. Furthermore, of those individuals separated or divorced, none were 60 years of age or older at the time of their injury.

Similarly, length of preinjury relationship appeared to play a role in whether a subject remained married ($F_{1,97} = 14.41, p < 0.001$). The number of years married prior to injury was almost three times longer for those who were still married at follow-up. As shown in Fig. 2, of those individuals separated or divorced, none were married for 30 years or more at the time of their injury.

With regard to severity of injury, length of unconsciousness was found to be related to postinjury marital status ($X^2 = 9.62; df = 3, p = 0.02$). Of those separated or divorced, twice as many were unconscious for 3 days or more in comparison to those married at follow-up (63% vs. 30%). Cause of injury (violent vs. non-violent) was also related to postinjury marital status. Of those separated or divorced, three times as many had a violent cause of injury. Admission GCS was unrelated to incidence of separation or divorce postinjury.

4. Discussion

Researchers and caregivers have expressed concern about high divorce rates after brain injury. Their concerns have likely been fueled by early outcome studies which are, unfortunately, characterized by small sample sizes. For example, Tate and her Australian colleagues [17] reported a 54% divorce rate among 31 couples within three to ten years postinjury. Thomsen [9] followed a sample of nine Danish patients ten to 15 years postinjury and reported a nearly 80% marital dissolution rate.

The present investigation provides a more optimistic view of marital stability. A sample of 120 American patients, who were married at the time of injury, was followed for 30 to 96 months. Analysis indicated a separation rate of 8% and a divorce rate of 17%, overall 25% of marriages had broken down. Table 4 compares findings from the present investigation to six other studies that provide information on marital stability. As indicated, studies have typically included persons with severe injury, have samples smaller than 50, and vary as to whether they provide information on divorce, separation, or marital breakdown (i.e., total number of divorces and separations).

Census information on divorce rates in the United States provides a comparison standard. Raley and Bumpass [13] documented that half of all first marriages will dissolve, based on the 1990 United States Current Population Survey (CPS). They noted, for those marriages that are formed before age 20, over 60% end in divorce versus about 40% of those over age 22. US Census data indicates, on average, first marriages that end in divorce last about 8 years [7]. The present investigation does not substantiate the notion that divorce rates for persons with brain injury are higher than those for the general population.

The present investigation was intended as a replication of Wood and Yurdakul, a study focused on postinjury relationship changes. In the United Kingdom, national statistics indicate a 38% failure rate for marriages among persons younger than 35. The 15% di-

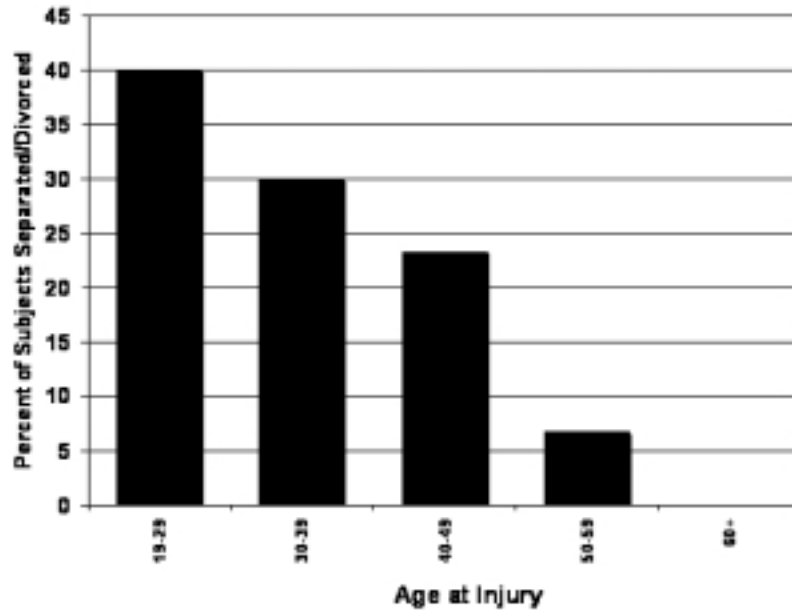


Fig. 1. Percentage of Subjects Separated/Divorced by Age at Injury.



Fig. 2. Percentage of Subjects Separated/Divorced by Number of Years Married Prior to Injury.

orce rate in Wood and Yurdakul’s sample is substantially less than the United Kingdom’s general population rate. The sample’s 34% separation rate suggests that divorce rates might have been significantly higher if the investigators had followed survivors for a longer time period.

The 17% divorce rate in the present investigation is comparable to the 15% rate reported by Wood and Yur-

dakul. However, their separation rate of 34% is considerably higher than the 8% rate identified in our sample. Differences in separation rates may be attributable to several factors including cultural views about commitment and marriage and methodological differences. The follow-up duration in Wood and Yurdakul’s study was approximately four years longer. They suggested that marriages are especially vulnerable between five

Table 4
Summary Table of Brain Injury Marital Stability Studies

| Author/Year | Sample Size | Time Postinjury | Severe Injury | Separation | Rates of Divorce | Breakdown |
|-----------------------|-------------|-----------------|---------------|------------|------------------|-----------|
| Panting/1972 | 10 | 2–7 yrs | 73% | 10% | 30% | 40% |
| Thomsen/1984 | 9 | 10–15 yrs | 100% | not given | not given | 78% |
| Tate/1989 | 31 | 3.4–9.7 yrs | 100% | not given | 54% | not given |
| Anderson-Parenté/1990 | 23 | not given | not given | not given | not given | 57% |
| Wood/1997 | 131 | 8 yrs (avg) | 76% | 34% | 15% | 49% |
| Wood/2005 | 48 | 5.5 yrs (avg) | 100% | not given | not given | 48% |
| Kreutzer/2006 | 120 | 4.1 yrs (avg) | 57% | 8% | 17% | 25% |

and six years postinjury. Furthermore, their sample contained 19% more persons with severe injury. The findings of the present study suggest that marital stability is associated with injury severity. Longer periods of unconsciousness were associated with a greater likelihood of divorce. In contrast, Wood and Yurdakul did not find an association between injury severity, as measured by duration of posttraumatic amnesia, and likelihood of marital breakdown.

Duration of relationship prior to injury appears to be an important protective factor. Wood and Yurdakul found that couples in surviving relationships were married twice as long as couples in relationships that broke down. In the present investigation, couples in surviving relationships were married nearly three times longer than those in relationships that dissolved.

Other potentially useful protective factors were identified by the present investigation. Analysis indicated that married survivors were nearly ten years older at the time of injury than survivors who later separated or divorced. A similar pattern of findings was reported by Anderson-Parenté, and Vanderploeg and colleagues [1, 20]. Maturity seems to be an advantage in maintaining marriages postinjury. Wood and Yurdakul did not find a relationship between age and marital stability. Survivors in their sample averaged 43 years old, comparable to 41 years old for the present sample.

The present investigation also indicated that victims of violence had greater difficulty sustaining marriages than persons injured otherwise. Brain injury researchers have suggested that victims of violence have greater difficulty being productive and maintaining social integration [5]. Wood and Yurdakul did not examine etiology as a breakdown risk factor.

There has been clinical speculation regarding gender differences and some have speculated that males are more likely to abandon female survivors than vice versa. Neither the present investigation nor Wood and Yurdakul's identified survivors' gender as a significant factor. Males comprised 74% of Wood and Yurdakul's sample and 68% of the current sample.

The present investigation has a number of limitations that should be considered. Follow-up information was obtained between 30 and 96 months postinjury. A longer follow-up interval would have provided a more accurate picture of long-term marital stability. The study was conducted at a single outpatient rehabilitation center with a sample comprised primarily of patients with severe brain injury. Most studies have focused on survivors with severe brain injury. A multi-center investigation including a broader sample of survivors with mild and moderate injuries would provide a better understanding of marital stability in the brain injury population. Furthermore, the present investigation utilized a cross-sectional design. A longitudinal design would provide a far better understanding of changes in marital status over time.

The present investigation provides basic descriptive information about marriages after injury. Participants were categorized as married, separated, or divorced. Outside the field of brain injury, marriage and family therapy professionals have developed a variety of tools to examine qualitative aspects of marital relationships. For example, several scales including the Kansas Marital Satisfaction Scale [15,22], the Revised Dyadic Adjustment Scale [2,3], and the Revised Marital Adjustment Test [3,6] have been developed to measure marital and relationship quality. The inclusion of such measures in future research will enable a far better understanding of changes after brain injury.

For many years, researchers have lamented that loss of relationships, strained relationships, and loneliness are far too common consequences of TBI. The present investigation helps to identify marriages that may be at greater risk for dissolution after injury. Clinicians may wish to more closely monitor persons who are younger, married for shorter periods of time, victims of violence, and those with more severe injuries. Multifaceted interventions, which include prevention, education, and psychological support programs, have the potential to improve marital stability.

Two assertions have been made about marital stability after brain injury. First, some have suggested that divorce and separation rates are high. Second, some have suggested that males are far more likely to leave female survivors. Fortunately, these two assertions remain unsubstantiated. Multi-center and longitudinal studies including measures of marital quality are needed to help survivors and their partners maintain mutually supportive and fulfilling marital relationships.

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