SOJNR
Southern Online Journal of Nursing Research

Volume 8 – Number 3 www.snrs.org

Loss of Resources and Depressive Symptoms after Traumatic Injury

Elizabeth R. Van Horn, PhD, RN, CCRN
Assistant Professor
School of Nursing
The University of North Carolina at Greensboro, NC

Merle Mishel, PhD, RN, FAAN
Kenan Professor of Nursing & Director, Doctoral and Post-doctoral Programs
School of Nursing
The University of North Carolina at Chapel Hill, NC
mishel@email.unc.edu

Corresponding author and reprint requests:

Elizabeth R. Van Horn, PhD, RN, CCRN
219 Moore Building
School of Nursing
UNCG
Greensboro, NC 27402
work: (336) 334-4942
fax: (336) 334-3628
e_vanhorn@uncg.edu

This research was supported by the following: NIH/NINR # T32 NR07091; Sigma Theta Tau, Alpha Alpha Chapter; and The University of North Carolina at Chapel Hill, Graduate School. The authors thank Elizabeth Tornquist and Dr. Patricia Crane for their editorial assistance in the preparation of this manuscript.

ABSTRACT

Background: Unintentional traumatic injury is a global health problem, and recovery from injury is often associated with loss and depression. The purpose of this study was to examine the relationships among trauma-related variables, loss of resources, coping, and depressive symptoms after traumatic injury. The Conservation of Resources model provided theoretical support for the study.

Methods: A cross-sectional survey design was used with a convenience sample of 50 trauma patients who had sustained a recent unintentional injury requiring hospitalization. Participants completed measures of general health, loss of resources, coping, and depressive symptoms. The study model was tested through a series of multiple regression analyses.

Results: Participants experienced multiple and varied resource losses and high levels of depressive symptoms. Poorer physical health and shorter hospital stays were significantly related to loss of resources. Loss of resources and coping significantly predicted depressive symptoms. The two types of losses most relevant to depressive symptoms were losses related to self and goal attainment, and loss of financial resources.

Conclusions: Loss of resources after injury appears to contribute to depressive symptoms during the early months of recovery. Early interventions are needed to help trauma patients preserve existing resources and prevent additional losses after injury.

Key words: injury, loss of resources, depression

Loss of Resources and Depressive Symptoms after Traumatic Injury

Introduction

Unintentional traumatic injury is a global health problem affecting up to 50 million individuals annually.[1] In the United States, traumatic injury is the fifth leading cause of death and a leading cause of disability.[2] Traumatic injury is a nondiscriminating phenomenon that strikes individuals of all ages, ethnicities, and socioeconomic status. The consequences of injury often result in personal, social, financial, and occupational losses,[3-5] and these losses may in turn lead to depressive symptoms, negatively affecting recovery.

Researchers have found that 30-50% of trauma patients sampled experienced symptoms of depression after injury.[6-8] This is of particular concern since depressive symptoms are a predictor of other poor outcomes after injury, including lower functional status, later return to work, and poorer quality of life.[9,10] Although not a direct, physical consequence of injury, depression during recovery can profoundly influence trauma recovery outcomes.

Researchers have examined the relationships of depressive symptoms after injury to age, length of hospital stay, injury type and severity, functional ability, quality of life, social support, and anxiety.[10-12] Much of the prior research on trauma recovery has focused on the predictive ability of physiologic variables to explain depression during recovery. In qualitative studies of individuals' experiences after injury researchers have identified loss as a central theme in the recovery process.[3,5,13] However, the relationship between loss of resources and

depression after traumatic injury has been examined in only one study, which found a significant relationship between loss of material resources and depression.[6] The study reported here examined relationships between trauma-related variables, loss of resources, coping, and depressive symptoms during early recovery after injury, in order to identify potential avenues for intervention to improve recovery outcomes.

The theoretical framework for the study was Hobfoll's conservation of resources (COR) model,[14,15] which focuses on the role of loss of resources in producing stress and stress-related disorders such as depression. The COR model categorizes resources as of four types: objects – such as a car, house, or jewelry; personal characteristics – for example, a sense of pride, accomplishment, stamina, and personal health; conditions – such as employment, marriage, relationships with others; and energies – including time, money, knowledge, and insurance. Worth noting is the inherent complex value of resources, as evidenced in both their existence and their ability to aid individuals in either resisting stress, or acquiring additional resources. As an example, the resource of money not only provides for social conditions such as security and status, but also enables individuals to obtain other resources, such as a higher education, property, insurance, or independence.

According to the COR model, individuals strive to maintain, protect, and build resources in the face of actual or potential loss of resources. When efforts to preserve resources fail and they are lost, psychological stress occurs, and this may result in negative psychological states such as depressive symptoms. Moreover, loss cycles may become cumulative, compounding stress and its negative effects.[14]

The concepts studied here were based on the COR model[14,15] and relevant variables in the trauma recovery literature. The concepts of the study model included: injury severity, physical health, hospital length of stay, time since injury, income, loss of resources, coping, and depressive symptoms (see Figure 1). The hypotheses tested in the study model include H 1 : Physical health is influenced by lower injury severity and greater time since injury. H 2 : Loss of resources is influenced by lower physical health, greater hospital length of stay, and lower income. H 3 : Coping is influenced by greater loss of resources. H 4 : Depressive symptoms are influenced by lesser coping and greater loss of resources.

Injury severity was expected to influence both physical health and hospital length of stay since the relationships between injury severity and these two variables have been supported in the trauma literature.[16,17] Because participants in the current study were between 1 and 4 months post injury, time since injury was also expected to influence physical health. The model concepts physical health and income were expected to negatively influence loss of resources, since the COR model proposes that individuals with higher levels of resources are less vulnerable to resource loss.[18] Further, higher income level prior to injury has

been associated with faster return to work, suggesting less loss of resources due to unemployment.[19,20] It may be that those with higher incomes have less physically demanding jobs, enabling a quicker return to work. Prolonged hospital stay was also expected to influence loss of resources through increased demands on existing resources, including mounting hospital bills, taxing of family and social support, and inability to work and provide self-care immediately after hospitalization.[4,10]

Loss of resources was in turn expected to influence both coping and depressive symptoms. The COR model proposes that actual and potential losses of resources produce stress, to which individuals respond through efforts to minimize resource loss and maximize resource gain.[14] The act of resource management was conceptualized as coping in the study model. Hobfoll and colleagues[21] have suggested that loss of resources also reduces individuals' abilities to engage in active coping. Thus, coping was expected to partially mediate the relationship between loss and depressive symptoms. Finally, the study proposed that loss of resources would directly influence the occurrence of depressive symptoms[14,15] since loss of a variety of types of resources has been found to be strongly associated with depressive symptoms in trauma recovery.[5,10,12]

Methods

The study used a cross-sectional design; participants completed a single interview with the first author, during which all study instruments were administered.

Setting and Sample

Following Institutional Review Board approval, which included obtaining HIPAA waivers and informed consent, a convenience sample of 50 participants was recruited from the trauma orthopaedic clinics of two major trauma centers in the southeastern United States. Participants were adults aged 25-55 years who had sustained a blunt force, unintentional trauma resulting in injury and requiring hospitalization of at least 24 hours. Inclusion criteria included ability to speak English, full or part-time employment at the time of injury, time since injury > 30 days and < 4 months, and cognitive ability to consent and participate in an interview. The age range was selected to increase the homogeneity of the sample and capture the working population. The employment criterion was used to obtain participants who depended to some degree on their ability to generate income, and who were likely to experience resource losses as a result of their injury and interruption of work status. Time since injury of 1 to 4 months was selected to capture participants who were currently experiencing loss of resources due to the injury. Potential participants' medical records were screened for diagnoses indicating cognitive limitations, and upon initial interview

participants were asked general orientation questions to further assess cognitive abilities.

Exclusion criteria included hospitalization due to injury within the last 10 years; injury to the central nervous system with neurological deficit; cognitive inability to participate in an interview; intentional injury, including gun shot wound, stabbing, assault, or self-inflicted injury; or self-reported treatment for depressive symptoms during the 12 months prior to injury. The study focused on unintentional injury because it occurs more frequently than intentional injury in all age groups, encompasses a greater percentage of injury-related disability, and is more often associated with occupational environments.[2] In addition to participant interviews, data were obtained through chart reviews and the trauma registry database maintained at each institution. Each participant received $20 for involvement in the study.

Instruments

The Injury Severity Score (ISS)[22] was used to measure injury severity. Injuries to six body areas are scored on a 5-point scale ranging from 1 (*minor*) to 5 (*critical*), and the ISS is calculated by squaring and summing the three highest subcategory scores. Values may range from 0 to 75 -- 1-9 minor; 10-15 moderate; 16-24 severe, and >24 very severe.[23] Validity of the ISS has been supported.[24] The ISS is reported in the medical record and was obtained from the trauma registry database at each institution.

Time since injury was calculated in weeks from the date of injury to the date of interview. Hospital length of stay was measured in days from the date of admission, counted as Day 1, to discharge. Annual household income was measured on a 6-point ordinal scale ranging from < $20,000 to > $100,000.

Physical health was defined as the aspects of well-being related to the physical body and was measured using the physical health factor of the Medical Outcomes Study Short-Form 36 version 2.0 (SF-36).[25] The physical health factor is the summed score of four subscales: physical function, role physical, bodily pain, and general health. Internal consistency reliabilities of the SF-36 have exceeded 0.70 in more than 25 studies.[26] Cronbach's alpha for the physical health factor was 0.79 in the present study.

Loss of resources was defined as the actual or potential loss of object, personal characteristic, condition, or energy resources as perceived by the person. Loss of resources was measured using the Conservation of Resources-Evaluation loss scale (COR-E)[14] on which participants rate on a 5-point scale the extent to which they have lost each of the 74 resources listed. Test-retest reliabilities of the COR-E with two samples rating losses for the past year ranged from 0.55 to 0.64.[27] Scores were comparable to those on commonly used recent life event scales. Factor analyses from these samples supported the existence of multiple distinct

factors in the COR-E, including personal/attainment, financial, time, work support, intimacy, and marriage/children. A subscale of the COR-E tested with trauma patients had a reported Cronbach's alpha of 0.88.[6] Cronbach's alpha in the present study was 0.94.

Coping was defined as cognitive, emotional, or behavioral strategies that individuals engage in to diminish feelings of stress, pain, or loss. Coping was measured with six subscales (24 items) of the COPE Inventory.[28] These items had been previously tested with individuals with lower extremity amputations and had been merged into a single coping factor.[29] The six subscales are active coping, planning, seeking instrumental social support, seeking emotional social support, positive reinterpretation, and acceptance. The validity of the original COPE Inventory was supported through principal components factor analysis.[28] In the present study, the alpha coefficient was 0.87.

Depression was defined as a generalized feeling of sadness or despair, and was measured using the Center for Epidemiologic Studies - Depression scale (CES-D),[30] on which individuals rate on a 4-point scale the frequency with which they experienced each of 20 symptoms in the preceding week. The CES-D has established reliability and validity.[31] Cronbach's alpha in the present study was 0.92.

Demographic data collected via self-report included age, race, gender, marital status, education, employment status and type of work at time of injury, current employment status, and health insurance prior to injury. Other data collected included injury date, type, location, mechanism, and setting. Demographic data were examined for potential covariate influence in the analyses.

Data Analyses

A series of regression models were analyzed to test the study hypotheses. A power analysis was completed prior to data collection. Using Power and Precision[32] to determine sample size estimations for the largest regression model (containing three variables), with a power of .80, alpha of .05, and an effect size of .20, the estimated sample size necessary to adequately test each hypothesis was 48. An effect size of .20 was used based on theoretical support from the COR model[14] and data from empirical studies examining the relationship between loss of resources and negative psychosocial outcomes.[33-35]

All study data were examined and tested for meeting the assumptions for multiple regression. Data transformation was performed for hospital length of stay. All other variables had normal distributions. Variables were also examined for collinearity and had acceptable parameters.[36]

In Model 1(H 1), physical health was regressed on injury severity and time since injury. In Model 2(H 2), loss of resources was regressed on income, physical

health, and hospital length of stay (LOS). In Model 3(H 3), coping was regressed on loss of resources. Finally, in Model 4(H 4), the variable depressive symptoms was regressed on loss of resources and coping.

All variables were entered into each equation simultaneously. Standardized regression betas were used for each coefficient to facilitate comparisons. Each coefficient was tested with *t*-tests of significance, and relationships with nonsignificant coefficients ($p > .05$) were trimmed from the study model after clinical and theoretical significance was examined. Statistical corrections for multiple comparisons were not made at the time of initial analyses because each relationship in the model was theoretically and empirically supported. However, conservative post-hoc Bonferroni corrections completed by dividing the p value (.05) by the number of tests (5) indicate that 3 of the 5 significant relationships in the model meet the corrected p value significance of .01.[36]

Results

A total of 87 trauma patients were approached for entry into the study; 12 (14%) did not meet the study criteria, 11 (13%) declined to participate, and 14 (16%) were unable to complete an interview before the study terminated. The final sample of 50 participants had a mean age of 39 (SD 8.4) and were predominantly male (70%). Nearly all were Caucasian (56%) or African American (36%). The largest proportion were married (44%). Most had a high school education (28%), or had completed some college or a graduate degree (58%). Types of employment included skilled labor (42%), professional (32%), unskilled labor (10%), self-employed (8%), and retail (8%). All but one participant were employed full-time at the time of injury; 82% had not returned to work, 12% were back to work part-time, and 6% were back to work full-time. The majority had health insurance at the time of injury (66%), though a third lacked health insurance despite being employed. The majority of participants (60%) had annual household incomes from $20,000 to $60,000; 30% had incomes above $60,000, and 10% had incomes less than $20,000. Most participants had sustained multiple injuries (66%), or leg or knee injuries (24%); the most common mechanism of injury was motor vehicle crash (64%), followed by fall (18%).

Descriptive statistics for the study variables are presented in Table 1. Injury severity scores (ISS) ranged from minor (40%), to moderate (24%), severe (20%), and very severe (16%). More than a third of participants had sustained severe or very severe injury, and they generally had low scores on the SF-36 physical health factor, indicating substantial limitations in the areas of physical function and related roles, and limitations due to bodily pain.

The mean CES-D score for the sample was 18.7 (SD 13.0). Using CES-D classifications, 48% had no depression (CES-D 0-14), 10% had probable mild to moderate depression (CES-D 15-21), and 44% had probable major depression (CES-D > 22).[37] Based on the accepted cutoff score of > 16, more than half

(52%) of the sample had a score potentially indicating clinical depression.[30] When participants were grouped according to CES-D scores equal to or above 16, and scores below 16, *t*-tests revealed no significant differences between the two groups in age, education, injury severity, hospital length of stay, or time since injury. However, there were significant differences in income and loss of resources. Participants with lower incomes ($p < .05$) and those with greater loss of resources ($p < .01$) had higher CES-D scores. These findings suggest that individuals with fewer financial resources and those who experienced greater resource losses were more vulnerable to depressive symptoms.

Hypothesis 1 was not supported since neither of the predicted variables influenced physical health ($F(2, 47) = 1.97$, $p > .05$). Hypothesis 2 was partially supported. Physical health and hospital length of stay, but not income, significantly predicted loss of resources ($F(3, 46) = 9.65$, $p < .01$), accounting for 38% of the variance. Lower levels of physical health and shorter, not longer, hospital stays were associated with greater loss of resources for participants. Hypothesis 3 was not supported, as loss of resources did not significantly predict coping ($F(1, 48) = .176$, $p > .05$). Hypothesis 4 was supported. Loss of resources and coping were significant predictors of depressive symptoms ($F(2, 47) = 27.96$, $p < .01$), explaining 54% of the variance in the study model. Participants who experienced greater loss of resources had higher CES-D scores, and participants with higher coping scores had lower CES-D scores. The final study model is presented in Figure 2.

Additional analyses of correlations between the SF-36 subscales and loss of resources revealed that the role-physical subscale was significantly correlated with loss of resources ($r = -.34$, $p < .05$). More than 80% of the sample reported losses in ability to work, stamina/endurance, and independence due to physical limitations from their injuries. These findings suggest that although the trauma patients experienced losses in a variety of areas of physical health, the loss of physical ability to perform regular daily and work activities was a primary contributor to the loss of resources.

Although income did not significantly influence the score on loss of resources, not surprisingly, it was significantly and negatively correlated with the financial factor on the loss of resources scale ($r = -.39$, $p < .01$), indicating that higher income was associated with less loss of financial resources.

Five of the six factors of the COR-E were significantly correlated with depressive symptoms ($r = .42$ to $.72$, $p < .05$). The personal/attainment factor ($r = .72$) and the financial factor ($r = .66$) showed the strongest correlations with depressive symptoms and the strongest inter-subscale correlation ($r = .69$), suggesting that losses related to self-identity and goal achievement and losses related to finances and generation of income contributed substantially to participants' depressive symptoms. Participants' mean scores on the coping subscales were

highest for acceptance and positive reinterpretation; however, only acceptance coping was significantly correlated with depressive symptoms (r = -.38, p < .01).

Discussion

The COR model[14,15] proved a useful theoretical framework for the study: The data substantiated the multiple, diverse, and cumulative losses experienced by trauma patients and the strong relationship between resource loss and depressive symptoms. In addition, the COR-E loss scale showed promise as a measure for quantifying the resource losses experienced by trauma patients.

Slightly more than half of the sample had CES-D scores of > 16, a score generally accepted as indicating possible clinical depression. This finding is consistent with the trauma literature, which suggests that a large percentage of trauma patients experience depressive symptoms at levels warranting intervention.[6-8] The high prevalence and severity of depressive symptoms in this sample points to a need to identify depression early during recovery from injury and develop and test interventions to reduce the depressive symptoms.

Loss of resources was strongly related to depressive symptoms. Participants sustained many and varied losses of resources, but the two types of losses most relevant to depressive symptoms were personal losses related to self and goal attainment, and loss of financial resources. Losses pertaining to feelings about oneself may be particularly damaging; prior trauma research has found that low self-efficacy after injury was associated with increased risk of screening positive for a depressive or anxiety disorder.[7]

Income and loss of resources distinguished those with CES-D scores equal to or above 16 from those with scores below 16. Thus lower socioeconomic status and loss of resources may contribute to trauma patients' vulnerability to depression during recovery from injury. This is consistent with the COR model, which notes that vulnerability to resource loss is influenced by preexisting levels of resources.[18] Individuals with fewer financial resources are initially more vulnerable to loss of financial resources after injury, which may include loss of employment, health insurance, and/or monetary resources. These losses are likely to contribute to other resource losses and to loss of individuals' ability to financially provide for themselves and their families. Read et al.[8] found that 6 months after injury, 63% of trauma patients reported financial hardships, and insurance and legal issues affecting themselves and their families. Therefore, early identification of individuals with lower socioeconomic status and early implementation of interventions to minimize financial losses are warranted.

The variable most strongly associated with loss of resources was physical health. Physical role limitations affected participants' abilities to generate income, maintain secure employment, provide for their own transportation and mobility, and participate in recreational, family, and social activities. These limitations

contributed to participants' loss of financial resources, which then led to other resource losses. These findings are consistent with the trauma literature, which suggests that physical functional and role physical limitations are the foremost problems impeding trauma patients' return to work 1 year after injury.[10,20] However, few studies have examined the impact of these limitations during early recovery. Implementing interventions early may be important to prevent the compounding spiral of losses that may ultimately lead to depression and other poor recovery outcomes.

Clearly, trauma patients who experience physical limitations threatening the ability to maintain employment are more vulnerable to resource loss and depressive symptoms. These patients may benefit from comprehensive medical services, including rehabilitation to improve physical function recovery and return to work, along with interventions to support them in preserving and managing existing resource stores.

The inverse relationship found between hospital length of stay and loss of resources was surprising. It may be that individuals with prolonged hospital stays experience fewer immediate losses due to support services of case managers or social workers, who aid them in garnering resources. Trauma patients who experience short hospital stays may have little time to prepare for discharge, and once home may find themselves immobile and isolated, and may not know what support services are available or be able to access them.

Discharge planning nurses and social workers are key to implementing support services in anticipation of losses during recovery. Assessments of job stability, financial resource stores, and available family and social support is important in helping trauma patients and their family members comprehend the losses they may encounter and initiate strategies to minimize loss. However, in a diagnosis-related group health care system that emphasizes short lengths of stay, trauma patients may be discharged before such assessments are made and resources can be located. Policy changes are needed to provide for more in-hospital resources devoted to preparation of trauma patients for discharge, thus maximizing the availability of resources during early recovery, and to establish more programs to support trauma patients once home.

Limitations

The study used a nonprobability, convenience sample of university medical center trauma patients, and thus the findings should be generalized to other trauma populations only with caution; however, the study sample was similar in age, race, and gender to the annual trauma population of the two study sites. The study would also have benefited from a sample large enough to test the entire model using structural equation modeling. The lack of statistical corrections for multiple comparison analyses may be a limitation of this study;

therefore, the study findings should be confirmed in an independent sample of trauma patients.

The use of cross-sectional design was also a limitation of this research; however, this design was selected for several reasons. Trauma patients are a vulnerable population having recently experienced a serious physical injury often resulting in functional limitations, pain, and related mobility and transportation difficulties; therefore, subject burden was a primary consideration. Second, this initial study would provide foundational data for future research on interventions to prevent and manage loss and improve outcomes during recovery from traumatic injury. Lastly, a focus on early recovery was desired; therefore, participants were interviewed once in the rehabilitation period after acute injury, but while still recovering at home. It is during this phase of recovery that losses are prevalent and relevant.

The study model presented a unidirectional relationship between loss of resources and depressive symptoms. Although it is logical to think that many losses experienced were a result of participants' injuries (e.g., loss of employment related to injury) and were not due to depression, it is possible that depressive symptoms may have precipitated or compounded resource loss, especially personal losses, such as loss of pride or feelings of personal value. Future longitudinal research can build on these findings to clarify the complex relationship between loss of resources and depression after injury, and advance the science regarding the recovery trajectory of trauma patients.

Conclusions

Research should explore the types of financial resources lost by trauma patients, the availability of financial support for these patients, and the knowledge and skills needed to use these resources. Understanding of these issues will provide a foundation for the development and testing of interventions to aid trauma patients in recognizing vulnerability to cumulative resource loss, minimizing additional loss, preserving current resource stores, and gaining resources.

A multidisciplinary approach is needed to help trauma patients manage the physical, social, financial, and emotional problems they may encounter during recovery. Strategies could include discharge planning that addresses the losses that may occur during recovery, interventions focused on depression, and the support services of social workers, case managers, financial advisors, and rehabilitation programs to improve outcomes. Nurses are well positioned to lead these efforts to aid trauma patients in recognizing their vulnerability to loss, help them prevent resource loss, and diminish the consequences of loss, including depressive symptoms that may impede their successful recovery.

Figure 1. Study model of depressive symptoms after traumatic injury.

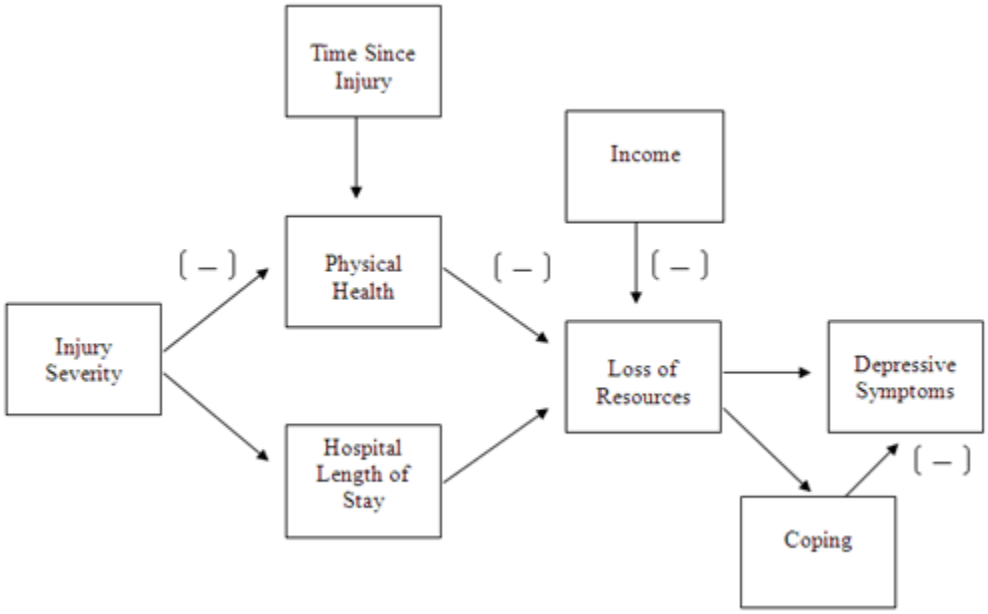
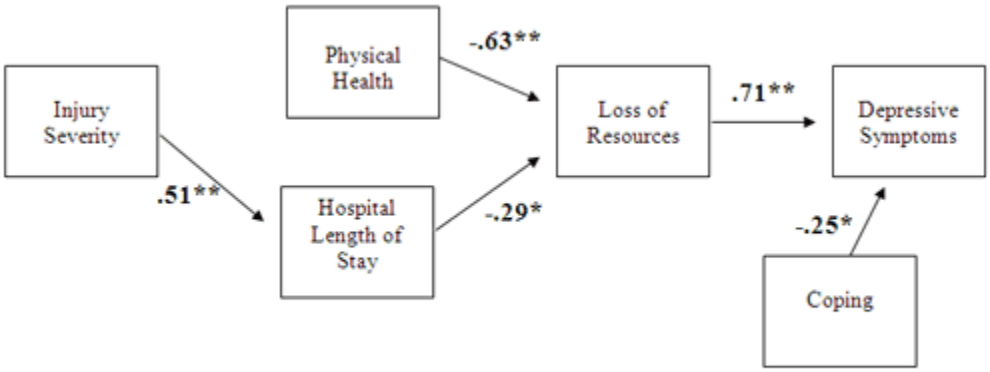


Table 1. Means, Standard Deviations, Ranges, and Possible Ranges for the Study Model Variables

Variable (Scale)	Mean	Standard Deviation	Range	Possible Range
Injury severity (ISS)	14.6	9.5	4-41	0-75
Time since injury (weeks)	9.3	3.9	4-19	--
Physical health (SF-36)	45.6	7.7	31-65	21-87
Hospital length of stay (days)	9.7	9.1	1-46	--
Loss of resources (COR-E)	144.1	44.6	75-236	0-370
Coping (COPE)	66.5	12.2	32-87	24-96
Depressive symptoms (CES-D)	18.7	13.0	0-56	0-60

Figure 2. Final reduced study model with standardized coefficients.



Note. * $p < .05$; ** $p < .01$

References

1. World Health Organization. (2008). *10 Facts on Injury and Violence.* Retrieved: June 21, 2008, http://www.who.int/features/factfiles/injuries/facts/en/index.html.
2. National Safety Council. (2006). *Injury Facts, 2006 Edition*. Itasca, IL: Author.
3. Cox, H., Turner, D., & Penney, W. (2002). Narratives of recovery from traumatic injury: Issues in the nursing care of patients in rehabilitation. *Journal of the Australasian Rehabilitation Nurses' Association, 5*(3), 8-15.
4. Halcomb, E., Daly, J., Davidson, P., Elliott, D., & Griffiths, R. (2005). Life beyond severe traumatic injury: An integrative review of the literature. *Australian Critical Care, 18*(1), 17-24.
5. Richmond, T. S., Thompson, H. J., Deatrick, J. A., & Kauder, D. R. (2000). Journey towards recovery following physical trauma. *Journal of Advanced Nursing, 32,* 1341-1347.
6. Cordova, M. J., Walser, R., Neff, J., & Ruzek, J. I. (2005). Predictors of emotional adjustment following traumatic injury: Personal, social, and material resources. *Prehospital and Disaster Medicine, 20,* 7-13.
7. McCarthy, M. L., MacKenzie, E. J., Edwin, D., Bosse, M. J., Castillo, R. C., Starr, A., & the LEAP study group. (2003). Psychological distress associated with severe lower-limb injury. *Journal of Bone and Joint Surgery, 85,* 1689-1697.
8. Read, K. M., Kufera, J. A., Dischinger, P. C., Kerns, T. J., Ho, S. M., Burgess, A. R., & Burch, C. A. (2004). Life-altering outcomes after lower extremity injury sustained in motor vehicle crashes. *The Journal of Trauma: Injury, Infection, and Critical Care, 57,* 815-823.
9. Holbrook, T. L., Anderson, J. P., Sieber, W. J., Browner, D., & Hoyt, D. B. (1999). Outcome after major trauma: 12-month and 18-month follow-up results from the Trauma Recovery Project. *The Journal of Trauma: Injury, Infection, and Critical Care, 46,* 765-773.
10. Michaels, A.J., Michaels, C.E., Smith, J.S., Moon, C.H., Peterson, C. & Long, W.B. (2000). Outcome from injury: General health, work status, and

satisfaction 12 months after trauma. *The Journal of Trauma: Injury, Infection, and Critical Care, 48,* 841-850.
11. Kiely, J. M., Brasel, K. J., Weidner, K. L., Guse, C. E., & Weigelt, J. A. (2006). Predicting quality of life six months after traumatic injury. *Journal of Trauma: Injury, Infection, and CriticalCare, 61,* 791-798.
12. Michaels, A. J., Madey, S. M., Krieg, J. C., & Long, W. B. (2001). Traditional injury scoring underestimates the relative consequences of orthopedic injury. *The Journal of Trauma: Injury, Infection, and Critical Care, 50,* 389-396.
13. Gustafsson, M., Persson, L. O., & Amilon, A. (2000). A qualitative study of stress factors in the early stage of acute traumatic hand injury. *Journal of Advanced Nursing, 32,* 1333-1340.
14. Hobfoll, S. (1988). *The ecology of stress.* New York: Hemisphere Publishing Corporation.
15. Hobfoll, S. (1989). Conservation of resources: A new attempt at conceptualizing stress. American Psychologist, 44, 513-524.
16. Fern, K. T., Smith, J. T., Zee, B., Lee, A., Borschneck, D., & Pichora, D. R. (1998). Trauma patients with multiple extremity injuries: Resource utilization and long-term outcome in relation to injury severity scores. *The Journal of Trauma: Injury, Infection, and Critical Care, 45,* 489-494.
17. Holbrook, T. L., Anderson, J. P., Sieber, W. J., Browner, D., & Hoyt, D. B. (1998). Outcome after major trauma: Discharge and 6-month follow-up results from the Trauma Recovery Project. *The Journal of Trauma: Injury, Infection, and Critical Care, 45,* 315- 324.
18. Hobfoll, S., (2001). The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. *Applied Psychology: An International Review, 50,* 337-421.
19. Herbert, J. S., & Ashworth, N. L. (2006). Predictors of return to work following traumatic work-related lower extremity amputation. *Disability and Rehabilitation, 28,* 613-618.
20. MacKenzie, E. J., Morris, J. A., Jurkovich, G. J., Yasui, Y., Cushing, B. M., Burgess, A. R., et al. (1998). Return to work following injury: The role of economic, social, and job- related factors. *American Journal of Public Health, 88,* 1630-1637.
21. Hobfoll, S., Freedy, J. R., Green, B. L., & Solomon, S. D. (1996). Coping in reaction to extreme stress: The roles of resource loss and resource availability (pp. 322-349). In M. Zeidner and N. S. Endler (Eds.), *Handbook of coping: Theory, research, applications.* New York: John Wiley and Sons, Inc.
22. Baker, S. P., O'Neill, B., Haddon, W., & Long, W. B. (1974). The Injury Severity Score: A method for describing patients with multiple injuries and evaluating emergency care. *The Journal of Trauma: Injury, Infection, and Critical Care, 14,* 187-196.
23. American College of Surgeons. (2005). *National trauma data bank report 2005.* Chicago, IL: Author.

24. Baker, S. P., & O'Neill, B. (1976). The Injury Severity Score: An update. *The Journal of Trauma: Injury, Infection, and Critical Care, 16,* 882-885.
25. Ware J.E., Kosinski M., & Dewey J.E. (2000). *How to score version 2 of the SF-36 health survey*. Lincoln, RI: QualityMetric, Incorporated.
26. Tsai, C., Bayliss M. S., & Ware, J. E. (1997). *SF-36 Health Survey Annotated Bibliography: Second Edition* (1988-1996). Boston, MA: Health Assessment Lab, New England Medical Center.
27. Hobfoll, S., E., Lilly, R. S., & Jackson, A. P. (1992). Conservation of social resources and the self. In H. O. F. Veiel and U. Baumann (Eds.), *The meaning and measurement of social support* (pp. 125-141). New York: Hemisphere Publishing Corporation.
28. Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56,* 267-283.
29. Livneh, H., Antonak, R. F., & Gerhardt, J. (1999). Psychosocial adaptation to amputation: The role of sociodemographic variables, disability-related factors and coping strategies. *International Journal of Rehabilitation Research, 22,* 21-31.
30. Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1,* 385-401.
31. Shinar, D. Gross, C. R., Price, T. R., Banko, M., Bolduc, P. L., & Robinson, R. G. (1986). Screening for depression in stroke patients: The reliability and validity of the Center for Epidemiologic Studies Depression scale. *Stroke, 17,* 241-245.
32. Borenstein, M., Rothstein, H., & Cohen, J. (1997). *Power and precision.* Teaneck, NJ:Biostat.
33. Freedy, J. R., Shaw, D. L., Jarrell, M. P., & Masters, C. R. (1992). Towards an understanding of the psychological impact of natural disasters: An application of the conservation of resources stress model. *Journal of Traumatic Stress, 5,* 441-454.
34. O'Neill, H. K., & Evans, B. A. (1999). Psychological distress during the Red River Flood: Predicting utility of the Conservation of Resources model. *Applied Behavioral Science Review, 7,* 159-169.
35. Wells, J. D., Hobfoll, S. E., & Lavin, J. (1999). When it rains, it pours: The greater impact of resource loss compared to gain on psychological distress. *Personality and Social Psychology Bulletin, 25,* 1172-1182.
36. Pedhazur, E. J. (1997). *Multiple regression in behavioral research: Explanation and prediction.* Fort Worth: Harcourt Brace College Publishers.
37. Measurement Excellence and Training Resource Information Center (METRIC). Critical review of Center for Epidemiologic Studies Depression Scale (CES-D). Retrieved: August 01, 2006 http://www.measurementexperts.org//instrument/instrument_reviews.asp?detail=12.