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Preliminary study on the relationship between visitation in the emergency department and posttraumatic mental health

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Abstract

This study documented family/friend support to patients in the Emergency Department (ED), including bedside visits and transportation of patients from the ED after discharge, and measured depression, anxiety, and stress symptoms within 2 weeks, 1 month and 3 months after motor vehicle accidents. Stress and depression symptoms significantly decreased during the initial three months. Family/friend visitation in the ED was negatively associated with anxiety and depression symptoms within 2 weeks and with stress symptoms months after trauma. This pilot study suggests family/friend visitation in the ED is associated with fewer mental health issues in the months following an accident.

Keywords

MVA; social support; Emergency Department; familial/friend visitation

Introduction

Approximately 4 million Americans are admitted to Emergency Departments (EDs) each year after traumatic motor vehicle accidents (MVA) (Platts-Mills, Hunold, Esserman, Sloane & McLean, 2012). Besides physical injuries, survivors of potentially life-threatening MVA experience acute psychological distress (Johansen, Wahl, Eilertsen & Weisaeth, 2007; Kuhn et al., 2006; Mayou, Bryant & Ehlers, 2001; Zatzick et al., 2007). Most survivors recover

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from brief traumatic stress, but 17–25% have posttraumatic stress disorder (PTSD) months later (Beck & Coffey, 2007; Daniels et al., 2012; Ehlers, Mayou & Bryant, 1998). Further evidence also links the initial stress symptoms to subsequent symptoms of PTSD months or years after the MVA (King, King, Salgado & Shalev, 2003; Norris, 2006; Peleg & Shalev, 2006). Negative emotions (e.g., fear, guilt, and helplessness) and ineffective cognitive processing may contribute to the development of PTSD (Brewin & Holmes, 2003; Liberzon & Sripada, 2008). In addition, the anxiety associated with medical treatment in the ED may worsen the posttraumatic experience (Mohta, Sethi, Tyagi & Mohta, 2003). The quality of initial care received in the ED may thus be critical for both physical recovery and mental health after trauma.

In addition to care received from the medical team in the ED, MVA survivors often receive visits from family and friends that potentially enhance mental recovery from trauma by providing social support. Social support is defined as social interaction and relationships that offer help or attachment and are perceived as loving or caring (Pruitt & Zoellner, 2008). Studies suggest that social support in the posttraumatic period may reduce risk for developing PTSD (Brewin, Andrews & Valentine, 2000; Maercker & Horn, 2012; Ozer, Best, Lipsey & Weiss, 2003). The presence of social support decreases distress after trauma exposure, while less or negative social support increases the risk for developing PTSD symptoms (Alloway & Bebbington, 1987). Furthermore, the highest levels of social support are associated with fewer PTSD symptoms (Brewin, 2005; Dougall, Ursano, Posluszny, Fullerton & Baum, 2001; Gabert-Quillen, Irish, Sledjeski, Fallon, Spoonster & Delahanty, 2012; Robinaugh et al., 2012). Although increasing evidence supports the beneficial effects of social support for countering development of PTSD, no studies have evaluated the impact of socially supportive interactions from family/friends in the ED on posttraumatic outcomes. The present pilot study explores the relationship between family/friend visitation in the ED and survivors' traumatic stress symptoms during the months after an MVA.

Methods

Participants

The patients were consecutively recruited from the ED of The University of Toledo Medical Center (UTMC), a level one trauma center. Institutional Review Board approval was obtained and all patients gave written informed consent. All subjects experienced an MVA and visited the ED within 48 hours of the accident, and upon testing they were alert, oriented, and had no intracranial injury. The study chose non-pregnant, English-speaking men and women of all races/ethnicities for observation. An Abbreviated Injury Scale (AIS) score was calculated to evaluate the severity of physical injury for each patient (Association for the Advancement of Automotive Medicine, 1998 update). Patients with an AIS score greater than 3 (that included serious brain injuries) were excluded due to concerns about their ability to respond to an ED interview and participate in the follow-up surveys. Forty patients participated in this pilot study.

Psychological assessments

Patients participating in the study completed self-report measures on three occasions: within 2 weeks, at 1 month, and at 3 months after the MVA. Self-report inventories were given in the ED and mailed to the participant's home 1 and 3 months after the MVA to obtain information on traumatic stress symptoms [PTSD Checklist-Stressor Version (PCL-S) (McDonald & Calhoun, 2010; Wilkins, Lang & Norman, 2011)] and depression [Center for Epidemiological Studies – Depression Scale (CES-D) (Radloff, 1977; Smarr & Keefer, 2011)]. Acute anxiety was evaluated using the State Anxiety subtest from the State-Trait Anxiety Inventory (STAI-Form XI) (Julian, 2011) within 2 weeks after the MVA. PCL-S is a 17-item (scored 1–5 per item) self-report measure that maps directly onto DSM-IV criteria of PTSD. The MVA was used as the index traumatic event when participants completed the PCL-S to repeatedly assess traumatic stress symptoms. The PCL-S was used because of good test-retest reliability. CES-D is a 20-item scale (scored 0–3 per item), which measures depressive symptoms. The STAI state anxiety scale is a 20-item self-report measure of current anxiety symptoms. The participants were interviewed by a trained clinical psychologist in the laboratory to test for diagnoses of PTSD at 12 weeks after MVA, using the Clinician-Administered PTSD Scale (CAPS) and the CAPS original sensitivity rule (Blake et al., 1995; Weathers, Keane & Davidson, 2001; Blanchard et al., 1995; Weathers, Ruscio & Keane, 1999). The Mini-International Neuropsychiatric Interview (MINI Version 6.0.0) was used to assess additional psychiatric conditions (Sheehan et al., 1998).

Measure of ED visitation

The measure of visitation in the ED was taken from the nursing log in the patients' medical records. Bedside visitations were logged by ED nurses when they regularly checked the patients. People who visited for professional rather than personal reasons, such as Police officers or other investigators, were not identified as visitors in the records. The ED nurses also routinely checked if anyone came to the ED to pick up the patients. A scale of visitation in ED from 0 to 2 was developed giving 1 point for presence of bedside visitors or for leaving the ED with visitors, and 2 points for both types of visitation. The scale of ED visitation allowed us to quantitatively evaluate the effects of visitation in ED.

Data Analysis

The changes in the scores of the PCL and CES-D over time from acute, one month, and three months after MVA were compared using the general linear model of repeated measures ANOVA in SPSS (version 17). In all the repeated measures ANOVA, Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, thus supporting the validity of the F-statistic. In addition, to explore the relationship between ED visiting and psychiatric symptoms after MVA, the univariate analysis of variance (UNIANOVA) of visitation in ED and scores of PCL, CES-D, and State Anxiety were performed at each time point after MVA. The UNIANOVA used our scale of visitation in ED (a categorical variable) as an independent variable, and scores of the anxiety, depression and PTSD questionnaires as dependent variables. In addition, gender was used as a random factor and age as a covariate. The association between the independent and dependent variables was examined.

The two-tailed $p < 0.05$ was considered to be significant. The results are reported as mean \pm standard deviation.

Results

Forty patients (23 males, 17 females; 37.8 ± 12.7 years old, ranging from 20–65) all experienced an MVA within 48 hours before their ED admission. All patients suffered similar levels of minor physical injuries due to the MVA (37 participants AIS 1 and 3 participants AIS 2) and were discharged from the ED to go home in a few hours or by the second day.

Twenty-three subjects returned the follow-up surveys and completed interviews over the initial three months after MVA, but seventeen subjects dropped out from follow-up after discharged from ED. There were no significant differences in initial scores of PCL, CES-D, or State Anxiety (two sample T tests, $p < 0.05$) between subjects who either participated in the follow-up study or who dropped out after the ED visit. Repeated measures analysis of symptom severity after the MVA demonstrated a significant decrease in the PCL and CES-D scores during the initial three months (PCL: $N=22$, $F=5.5$, $df=2$, $p=0.01$, $\eta^2=0.208$; CES-D: $n=8$, $F=4.186$, $df=2$, $p=0.047$, $\eta^2=0.374$). The post-hoc tests showed that PCL scores were not different from acute time to one month ($F=0.799$, $P=0.381$, $\eta^2=0.037$), but significantly decreased by 3 months after MVA as compared to both acute time ($F=7.362$, $P=0.013$, $\eta^2=0.260$) and to one month after MVA ($F=9.494$, $P=0.006$, $\eta^2=0.311$). CES-D scores decreased significantly from acute time to 3 months after MVA ($F=14.280$, $P=0.007$, $\eta^2=0.671$), but both time points were not different from the scores at one month after MVA (acute vs. one month: $F=2.299$, $P=0.173$, $\eta^2=0.247$; one month vs. three months: $F=1.191$, $P=0.311$, $\eta^2=0.145$). Twenty-three patients were interviewed with the CAPS and MINI (103.5 \pm 27.0 days after MVA). One subject met the PTSD diagnosis with comorbid panic disorder and suicidality at 3 months after MVA. Three participants had alcohol abuse, one participant had current major depressive episode and antisocial personality disorder, and one participant had generalized anxiety disorder. The other subjects were free of any Axis I psychiatric disorders.

A majority of participants were either visited by family or friends while they were treated in the ED within hours after MVA, taken home by family or friends or both. Thirty-one participants left with a family member or friend, while 9 participants left alone. Thirteen participants had a bedside visitor while they were treated in the ED, while no bedside visitors were logged in the medical record for the other 27 subjects. Twenty-two participants (44%) had a visitation score of one (i.e., one kind of visitation), and 11 participants (22%) had a score of two (i.e., both types of visitation). In contrast, 7 participants (17.5%) had a score of zero (i.e., no visitation). Among three visitation scale levels (0, 1, or 2), patients' stay length in ED were 146 ± 60 , 160 ± 95 , and 180 ± 93 minutes, respectively. There was no significant group difference ($F=0.366$, $P=0.696$).

Between-group UNIANOVA (Table 1) suggested a significant main effect for the ED visitation categories on State Anxiety scores in acute time after MVA ($n=25$, $F=5.132$, $df=2$, $p=0.016$, $\eta^2=0.339$), CES-D scores ($n=32$, $F=3.396$, $df=2$, $p=0.048$, $\eta^2=0.201$), within acute

time after MVA, and PCL scores at 1 and 3 months after MVA (one month: $n=25$, $F=4.962$, $df=2$, $p=0.018$, $\eta^2=0.332$; three month: $n=24$, $F=4.15$, $df=2$, $p=0.032$, $\eta^2=0.304$). There was no significant effect for the ED visitation categories on PCL scores in acute time ($n=32$, $F=1.066$, $df=2$, $p=0.356$) or CES-D scores at one month ($n=14$, $F=3.371$, $df=2$, $p=0.081$). Follow-up tests (Figure-1) on contrasts between levels of ED visitation scales indicated that ED visitation was associated with lower acute State Anxiety scores ($p_{(\text{scale 1 to 0})} = 0.012$, $p_{(\text{scale 2 to 1})} = 0.015$), with lower CES-D scores within acute time ($p_{(\text{scale 1 to 0})} = 0.026$, $p_{(\text{scale 2 to 0})} = 0.022$), with lower PCL scores at 1 month after MVA ($p_{(\text{scale 1 to 0})} = 0.005$) and with lower PCL scores at 3 months after MVA ($p_{(\text{scale 1 to 0})} = 0.011$, $p_{(\text{scale 2 to 0})} = 0.038$) compared to subjects who had no ED visitation. The effects of age and gender were non-significant.

Discussion

This pilot study assessed the relationship between ED visitation and psychological symptoms at different time-points following an MVA. The results suggest that in-ED visits were associated with lower anxiety and depression symptoms early, and lower PTSD symptoms later.

There is interest in early interventions to reduce traumatic stress in the post-trauma period. Pharmacological approaches (acute administration of opioids, beta-adrenergic blockers, or NMDA receptor antagonists) and psychological approaches (debriefing or prolonged exposure interventions) have been tried in the immediate post-traumatic period, but the results have been mixed at best (Searcy, Bobadilla, Gordon, Jacques & Elliott, 2012; Bryant, Creamer, O'Donnell, Silove & McFarlane, 2009; Holbrook, Galarneau, Dye, Quinn & Dougherty, 2010; Donovan, 2010; Schonenberg, Reichwald, Domes, Badke & Hautzinger, 2008; Kearns, Ressler, Zatzick & Rothbaum, 2012). Therefore, continued research is needed to identify alternative effective interventions that may benefit patients in the acute post-traumatic period.

The current findings suggest that providing social support in ED within hours after MVA might be beneficial for post-MVA recovery from psychological distress. Visitation of a family member or friend is different from having a healthcare professional visiting the patient. A recent review proposed that social and interpersonal processes may predict the severity of PTSD after trauma (Maercker & Horn, 2012). In this socio-interpersonal model of PTSD, family and friends are considered as close relationships, and the ED medical staff may be considered as a distant social relationship. Close social relationships are characterized by a higher level of psychological intimacy than a distant social relationship. Family members and friends provide a level of familiarity and comfort that healthcare professionals cannot. The survivors are more likely to disclose their negative affect and to perceive empathy from individuals with close relationships. Talking with those who are close to a patient may also allow patients to process what occurred more completely. In addition, ED healthcare professionals are trained to pay attention to the survivor's injury and disease, whereas a family member/friend displays concern with a more holistic emphasis including interest in details of the trauma, injuries, feelings, finances, and legal issues. The close social relationship may influence the quantity and quality of a patient's stress

symptoms (Maercker & Horn, 2012). Family presence in the intensive care unit (ICU) may provide cultural and spiritual supports and facilitate communication between survivors and ED staff (Davidson et al., 2007; Hepworth, Hendrickson & Lopez, 1994); therefore increased family visitation has been recommended by the American Association of Critical-Care Nurses (AACN, 2012). Presence of social support in the ED within hours after the traumatic event may be a cost-effective approach to improve the mental health of trauma survivors. However, it may also be that patients who are more likely to have visitors are those who already have strong interpersonal relationships and social support networks in their lives. Thus, number of visits may be an indicator of support that already exists rather than an effective acute intervention. In summary, the family/friend ED visitation is a good indication of social support that helps survivors to recover from a traumatic event.

In this pilot study we report a negative relationship between attendance of ED visitors and the later presence of PTSD and depression symptoms, but these findings are subject to a few limitations. First, this study only reported bedside visitors and transportation providers that were available in the standard records of patients' routine care; moreover, the ED visiting scale simply counted the types of contacts logged in the record. Further Systematic evaluation of ED visitation in other ways will help to examine the relationship between ED visitation and mental health of trauma survivors. Second, ED visitations are necessary but may not be sufficient to provide social support to the survivor. Private cars are a major type of transportation in the region where this study was conducted, but driving a motor vehicle from ED to home is very likely to be physically and emotionally challenging to traumatized and injured survivors only a few hours after an MVA. Therefore, we consider that providing transportation to these injured survivors is supportive. We also consider that bedside visitation of family or friends can be supportive. There is no evidence that survivors recognize the importance of support factors to their recovery. Subjective measures of the degree and quality of social support from visitors as perceived by MVA survivors in ED would be important additional data. Finally, the small sample size of this pilot study, especially the loss of subjects in the three months follow-up, limits the findings. The current pilot study suggests family/friend visitation in the ED is associated with fewer mental health issues in months following an accident. Future studies will further evaluate the beneficial effects of the early initiation of social support.

References

- AACN. Family presence: visitation in the adult ICU. *Critical Care Nurse*. 2012; 32(4):76–78.
- Alloway R, Bebbington P. The buffer theory of social support—a review of the literature. *Psychological Medicine*. 1987; 17(1):91–108. [PubMed: 3575581]
- Beck JG, Coffey SF. Assessment and treatment of PTSD after a motor vehicle collision: Empirical findings and clinical observations. *Prof Psychol Res Pr*. 2007; 38(6):629–639. [PubMed: 18509507]
- Blake DD, Weathers FW, Nagy LM, Kaloupek DG, Gusman FD, Charney DS, et al. The development of a Clinician-Administered PTSD Scale. *Journal of Traumatic Stress*. 1995; 8(1):75–90. [PubMed: 7712061]
- Blanchard EB, Hickling EJ, Taylor AE, Forneris CA, Loos W, Jaccard J. Effects of varying scoring rules of the Clinician-Administered PTSD Scale (CAPS) for the diagnosis of post-traumatic stress disorder in motor vehicle accident victims. *Behav Res Ther*. 1995; 33(4):471–475. [PubMed: 7755537]

- Brewin CR. Risk factor effect sizes in PTSD: what this means for intervention. *J Trauma Dissociation*. 2005; 6(2):123–130. [PubMed: 16150674]
- Brewin CR, Andrews B, Valentine JD. Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*. 2000; 68(5):748–766. [PubMed: 11068961]
- Brewin CR, Holmes EA. Psychological theories of posttraumatic stress disorder. *Clinical Psychology Review*. 2003; 23(3):339–376. [PubMed: 12729677]
- Bryant RA, Creamer M, O'Donnell M, Silove D, McFarlane AC. A study of the protective function of acute morphine administration on subsequent posttraumatic stress disorder. *Biol Psychiatry*. 2009; 65(5):438–440. [PubMed: 19058787]
- Daniels JK, Coupland NJ, Hegadoren KM, Rowe BH, Densmore M, Neufeld RW, et al. Neural and behavioral correlates of peritraumatic dissociation in an acutely traumatized sample. *J Clin Psychiatry*. 2012; 73(4):420–426. [PubMed: 22394402]
- Davidson JE, Powers K, Hedayat KM, Tieszen M, Kon AA, Shepard E, et al. Clinical practice guidelines for support of the family in the patient-centered intensive care unit: American College of Critical Care Medicine Task Force 2004–2005. *Critical Care Medicine*. 2007; 35(2):605–622. [PubMed: 17205007]
- Donovan E. Propranolol use in the prevention and treatment of posttraumatic stress disorder in military veterans: forgetting therapy revisited. *Perspectives in Biology and Medicine*. 2010; 53(1):61–74. [PubMed: 20173296]
- Dougall AL, Ursano RJ, Posluszny DM, Fullerton CS, Baum A. Predictors of posttraumatic stress among victims of motor vehicle accidents. *Psychosom Med*. 2001; 63(3):402–411. [PubMed: 11382267]
- Ehlers A, Mayou RA, Bryant B. Psychological predictors of chronic posttraumatic stress disorder after motor vehicle accidents. *Journal of Abnormal Psychology*. 1998; 107(3):508–519. [PubMed: 9715585]
- Gabert-Quillen CA, Irish LA, Sledjeski E, Fallon W, Spoonster E, Delahanty DL. The Impact of Social Support on the Relationship between Trauma History and PTSD Symptoms in Motor Vehicle Accident Victims. *Int J Stress Manag*. 2012; 19(1):69–79. [PubMed: 22468117]
- Hepworth JT, Hendrickson SG, Lopez J. Time series analysis of physiological response during ICU visitation. *Western Journal of Nursing Research*. 1994; 16(6):704–717. [PubMed: 7839685]
- Holbrook TL, Galarnau MR, Dye JL, Quinn K, Dougherty AL. Morphine use after combat injury in Iraq and post-traumatic stress disorder. *N Engl J Med*. 2010; 362(2):110–117. [PubMed: 20071700]
- Johansen VA, Wahl AK, Eilertsen DE, Weisaeth L. Prevalence and predictors of post-traumatic stress disorder (PTSD) in physically injured victims of non-domestic violence - A longitudinal study. *Social Psychiatry and Psychiatric Epidemiology*. 2007; 42(7):583–593. [PubMed: 17530151]
- Julian LJ. Measures of anxiety: State-Trait Anxiety Inventory (STAI), Beck Anxiety Inventory (BAI), and Hospital Anxiety and Depression Scale-Anxiety (HADS-A). *Arthritis Care & Research*. 2011; 63(S11):S467–S472. [PubMed: 22588767]
- Kearns MC, Ressler KJ, Zatzick D, Rothbaum BO. Early interventions for PTSD: a review. *Depression and Anxiety*. 2012; 29(10):833–42. [PubMed: 22941845]
- King LA, King DW, Salgado DM, Shalev AY. Contemporary longitudinal methods for the study of trauma and posttraumatic stress disorder. *CNS Spectr*. 2003; 8(9):686–692. [PubMed: 15079142]
- Kuhn M, Ehler U, Rumpf HJ, Backhaus J, Hohagen F, Broocks A. Onset and maintenance of psychiatric disorders after serious accidents. *European Archives of Psychiatry and Clinical Neuroscience*. 2006; 256(8):497–503. [PubMed: 16917684]
- Liberzon I, Sripada CS. The functional neuroanatomy of PTSD: a critical review. *Progress in Brain Research*. 2008; 167:151–169. [PubMed: 18037013]
- Maercker A, Horn AB. A Socio-interpersonal Perspective on PTSD: The Case for Environments and Interpersonal Processes. *Clin Psychol Psychother*. 2012
- Mayou R, Bryant B, Ehlers A. Prediction of psychological outcomes one year after a motor vehicle accident. *American Journal of Psychiatry*. 2001; 158(8):1231–1238. [PubMed: 11481156]

- McDonald SD, Calhoun PS. The diagnostic accuracy of the PTSD Checklist: A critical review. *Clinical Psychology Review*. 2010; 30(8):976–987. [PubMed: 20705376]
- Mohta M, Sethi AK, Tyagi A, Mohta A. Psychological care in trauma patients. *Injury*. 2003; 34(1):17–25. [PubMed: 12531372]
- Norris FH. Disaster research methods: past progress and future directions. *J Trauma Stress*. 2006; 19(2):173–184. [PubMed: 16612819]
- Ozer EJ, Best SR, Lipsey TL, Weiss DS. Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychological Bulletin*. 2003; 129(1):52–73. [PubMed: 12555794]
- Peleg T, Shalev AY. Longitudinal studies of PTSD: overview of findings and methods. *CNS Spectr*. 2006; 11(8):589–602. [PubMed: 16871125]
- Platts-Mills TF, Hunold KM, Esserman DA, Sloane PD, McLean SA. Motor vehicle collision-related emergency department visits by older adults in the United States. *Academic Emergency Medicine*. 2012; 19(7):821–827. [PubMed: 22724382]
- Pruitt LD, Zoellner LA. The impact of social support: an analogue investigation of the aftermath of trauma exposure. *Journal of Anxiety Disorders*. 2008; 22(2):253–262. [PubMed: 17368829]
- Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977; 1:385–401.
- Robinaugh DJ, Marques L, Traeger LN, Marks EH, Sung SC, Gayle Beck J, et al. Understanding the relationship of perceived social support to post-trauma cognitions and posttraumatic stress disorder. *Journal of Anxiety Disorders*. 2012; 25(8):1072–1078. [PubMed: 21820854]
- Schonenberg M, Reichwald U, Domes G, Badke A, Hautzinger M. Ketamine aggravates symptoms of acute stress disorder in a naturalistic sample of accident victims. *Journal of Psychopharmacology*. 2008; 22(5):493–497. [PubMed: 18208917]
- Searcy CP, Bobadilla L, Gordon WA, Jacques S, Elliott L. Pharmacological Prevention of Combat-Related PTSD: A Literature Review. *Military Medicine*. 2012; 177(6):649–654. [PubMed: 22730839]
- Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry*. 1998; 59(Suppl 20): 22–33. quiz 34–57. [PubMed: 9881538]
- Smarr KL, Keefer AL. Measures of depression and depressive symptoms: Beck Depression Inventory-II (BDI-II), Center for Epidemiologic Studies Depression Scale (CES-D), Geriatric Depression Scale (GDS), Hospital Anxiety and Depression Scale (HADS), and Patient Health Questionnaire-9 (PHQ-9). *Arthritis Care & Research*. 2011; 63(S11):S454–S466. [PubMed: 22588766]
- Weathers FW, Keane TM, Davidson JR. Clinician-administered PTSD scale: a review of the first ten years of research. *Depression and Anxiety*. 2001; 13(3):132–156. [PubMed: 11387733]
- Weathers FW, Ruscio AM, Keane TM. Psychometric properties of nine scoring rules for the Clinician-Administered Posttraumatic Stress Disorder Scale. *Psychological Assessment*. 1999; 11:124–133.
- Wilkins KC, Lang AJ, Norman SB. Synthesis of the psychometric properties of the PTSD checklist (PCL) military, civilian, and specific versions. *Depression and Anxiety*. 2011; 28(7):596–606. [PubMed: 21681864]
- Zatzick DF, Rivara FP, Nathens AB, Jurkovich GJ, Wang J, Fan MY, et al. A nationwide US study of post-traumatic stress after hospitalization for physical injury. *Psychological Medicine*. 2007; 37(10):1469–1480. [PubMed: 17559704]

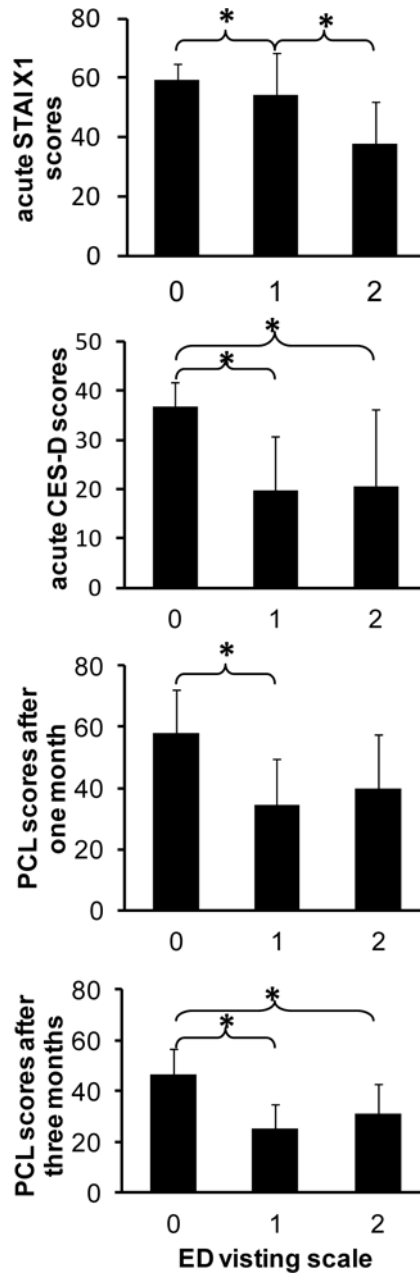


Figure-1.

TABLE 1

Progressive changes in anxiety, stress symptoms, and depression symptoms, and their relationships with the ED visiting scale.

	ED record	acute			after one month			after three months		
		STAI XI	PCL	SCE-D	PCL	SCE-D	PCL	SCE-D	PCL	SCE-D
scores		51.3±14.7	36.6±15.1	22.6±13.2	40.6±17.6	18.6±11.6	30.2±12.5	14.7±10.3		
post-MVA days	0.4±1.3	5.5±5.8	6.1±4.9	8.7±4.8	40±8.7	43.8±8.5	103.1±18.5	104.6±24.2		
age	37.6±12.5	38.1±12.6	38.1±12.6	35.7±11.6	36±12.2	35.2±12.5	37.6±13.4	38.9±13.4		
N (male/female)	40 (17/23)	25 (10/15)	38 (17/21)	32 (13/19)	25 (10/15)	14 (6/8)	24 (9/15)	11 (4/7)		
ED	0	59.3±5.6 (n=4)	44.8±10.4 (n=5)	36.8±5 (n=5)	57.8±14.4 (n=5)	30±9 (n=3)	46.8±9.7 (n=4)	25.5±3.5 (n=2)		
visiting	1	54.5±13.8 (n=15)	36.7±16.3 (n=22)	19.7±11.1 (n=18)	34.2±15.1 (n=13)	12.3±8.8 (n=6)	25.1±9.5 (n=14)	13.5±9.8 (n=8)		
scale	2	38±13.8 (n=6)	32.5±13.7 (n=11)	20.4±15.7 (n=9)	40±17.5 (n=7)	19.4±11.9 (n=5)	30.8±11.9 (n=6)	3 (n=1)		
F		5.132	1.066	3.396	4.962	3.371	4.15	omit		
df		20,2	33,2	27,2	20,2	9,2	19,2			
P		0.016*	0.356	0.048*	0.018*	0.081	0.032*			

* Difference among levels of ED visiting scale (P<0.05)