

Incidence and predictors of neck and widespread pain after motor vehicle collision among US litigants and nonlitigants



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ABSTRACT

Debate continues regarding the influence of litigation on pain outcomes after motor vehicle collision (MVC). In this study we enrolled European Americans presenting to the emergency department (ED) in the hours after MVC (n = 948). Six weeks later, participants were interviewed regarding pain symptoms and asked about their participation in MVC-related litigation. The incidence and predictors of neck pain and widespread pain 6 weeks after MVC were compared among those engaged in litigation (litigants) and those not engaged in litigation (nonlitigants). Among the 859 of 948 (91%) participants completing 6-week follow-up, 711 of 849 (83%) were nonlitigants. Compared to nonlitigants, litigants were less educated and had more severe neck pain and overall pain, and a greater extent of pain at the time of ED evaluation. Among individuals not engaged in litigation, persistent pain 6 weeks after MVC was common: 199 of 711 (28%) had moderate or severe neck pain, 92 of 711 (13%) had widespread pain, and 29 of 711 (4%) had fibromyalgia-like symptoms. Incidence of all 3 outcomes was significantly higher among litigants. Initial pain severity in the ED predicted pain outcomes among both litigants and nonlitigants. Markers of socioeconomic disadvantage predicted worse pain outcomes in litigants but not nonlitigants, and individual pain and psychological symptoms were less predictive of pain outcomes among those engaged in litigation. These data demonstrate that persistent pain after MVC is common among those not engaged in litigation, and provide evidence for bidirectional influences between pain outcomes and litigation after MVC.

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1. Introduction

Motor vehicle collisions (MVCs) result in 50 million injuries worldwide and almost 4 million US emergency department (ED) visits each year [41,61]. In the United States, approximately 90% of individuals presenting to the ED after MVC are discharged to

home after evaluation [45]. Persistent pain after MVC in this population is a common and costly public health problem [11].

Initial reports of persistent pain after MVC focused on neck pain, often termed whiplash. This term was subsequently revised to whiplash-associated disorders due to evidence that symptoms after MVC include not only neck pain but also pain in adjacent body regions and other cognitive and somatic symptoms [56]. More recently, it has been demonstrated that pain after MVC also may be widespread [22,25,69,70]. In addition, evidence suggests that fibromyalgia (FM) also may occur after MVC [9,34].

Compensation seeking has long been believed by some to be a dominant factor in complaints of persistent pain after MVC

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[17,37,51]. Others have pointed out that pain persistence after MVC may be associated with compensation seeking simply because those with worse health outcomes incur more costs from their condition and therefore are more likely to seek financial assistance [53,54]. The ongoing debate regarding the role of compensation has led to whiplash-associated disorders being described as “one of the most controversial conditions in medicine” [10].

To help understand the influence of compensation seeking on pain after MVC, it would be useful to prospectively compare pain outcomes and predictors of persistent pain among individuals who are engaged vs not engaged in compensation seeking. To date this has not been possible either because the majority of study participants with persistent pain have been seeking compensation [20,27,57] or because outcomes have evaluated time to insurance claim closure rather than pain symptoms directly [12,13].

In this study we recruited individuals presenting to the ED in the hours after MVC in several “no fault” insurance states in the United States, where litigation related to persistent post-MVC pain is more restricted [63], and prospectively compared the incidence and predictors of moderate or severe neck pain (MSNP) and widespread pain (WP) 6 weeks after the collision among individuals who are engaged vs not engaged in compensation seeking. Six weeks after MVC is an important time point because evidence suggests that individuals tend to establish a recovery set point 4 to 10 weeks after MVC, which thereafter is more resistant to change [5,8,26,36,58]. We hypothesized that MSNP would be common after MVC among individuals not engaged in litigation, and that WP and FM-like symptoms also would occur among nonlitigants. We also hypothesized that pain outcomes would be more common among those engaged in litigation. Consistent with the biopsychosocial model and with the potential contribution of stress systems modulated by supraspinal processes [33], we hypothesized that individual psychological, somatosensory, and cognitive characteristics, as well as sociodemographic and collision characteristics, would predict pain outcomes after MVC in both groups. Finally, we hypothesized that predictors of persistent pain among litigants and nonlitigants would be similar.

2. Methods

2.1. Design and setting

This prospective longitudinal study enrolled patients presenting to the ED within 24 hours of MVC. Data were collected at 8 EDs in 4 no-fault MVC litigation/insurance states (Michigan, Massachusetts, New York, and Florida) between February 2009 and October 2011. The study was approved by the institutional review boards of all participating hospitals, and each participant provided written informed consent. Complete information regarding study design, procedures, and methods has been described previously [44].

2.2. Participant eligibility criteria and study sites

Patients ages 18 to 65 who presented to the ED within 24 hours after an MVC and were unlikely to require hospitalization were screened for eligibility. Patients who were admitted to the hospital, had fractures other than phalangeal fractures, had more than 4 lacerations requiring sutures or a single laceration more than 20 cm in length, or had intracranial or spinal injuries were excluded. Spinal injury was defined by the presence of a fracture, dislocation, or new neurologic deficit. Enrollment also was limited to non-Hispanic white subjects (the most common ethnicity at study sites) because the study included the collection of genetic data, and genetic analyses potentially are biased by population stratification [14]. Patients who were not alert and oriented also were excluded, as were pregnant patients, prisoners, patients unable to read and

understand English, patients taking a β -adrenoreceptor antagonist, and patients taking opioids above a total daily dose of 20 mg of oral morphine or equivalent.

2.3. Study procedures

Eligible and consenting participants completed ED interview evaluations regarding pre-MVC health status, the details of the MVC, and current symptoms. Interviews were conducted by research assistants at the time of the ED visit using a web-based survey with explicit definitions of variables. Before enrolling patients in the ED, each research assistant completed a study training module followed by an interview with a standardized mock ED patient. Comparison of mock ED patient data across research assistants demonstrated an error rate of 1.3%. Injury characteristics and medications administered in the ED were obtained by data extraction from the ED medical record. Six weeks after the MVC, participants completed a follow-up interview online, by telephone, or via mail. Regardless of follow-up type, survey content was identical. Participants were compensated \$50 for completing the ED interview and \$60 for completing the 6-week interview.

2.4. Measures

A number of measures were used to assess health status before the MVC and symptoms in the ED. Complete study measures are described in full elsewhere [44].

2.4.1. Participant demographics

Participant demographic characteristics (including age, gender, income, height, weight, and educational attainment) were obtained from the ED medical record and from participant self-report. Participants also were asked during the interview to report their current smoking status and whether they had ever smoked tobacco. Health insurance coverage was obtained via self-report and classified as insured or not insured.

2.4.2. Collision and injury characteristics

During the ED interview, participants completed a structured interview questionnaire evaluating collision characteristics; responses to this questionnaire have been shown to provide accurate collision information [31]. Collision characteristics assessed included seat belt use, air bag deployment, participant location in the vehicle, speed of the participant's vehicle, direction of vehicle impact, and extent of vehicle damage (rated by the participant as minor, moderate, or severe/not drivable). Data regarding participant injury was abstracted from the ED medical record, including the presence and location of fractures of the phalanges (as described earlier, other fracture types resulted in participant exclusion), minor lacerations, contusions, avulsions, and abrasions. In addition, participants also were asked whether they believed the collision was their own fault, the fault of the other driver, or no one's fault.

2.4.3. Pain assessments and pain outcome definitions

Pain extent during the month before the MVC and in the ED both were assessed at the time of ED evaluation; pain extent 6 weeks after MVC was assessed at the 6-week time point. Pain extent was assessed in 19 discrete body regions evaluated in the regional pain scale [66] and in the head region. Individuals reporting ≥ 7 bodily regions of pain were defined as having WP during that time period. This cut-off was selected to be consistent with 2010 American College of Rheumatology criteria, which defines WP as ≥ 7 body regions of pain during the past week [67].

In each body region in which the participant reported pain, average pain severity was assessed using a verbal 0-to-10 nu-

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