

Prevalence and characteristics of chronic pain in veterans with spinal cord injury

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Abstract—To assess prevalence and characteristics of individual chronic (>6 mo) pain components in the veteran spinal cord injury (SCI) population, we conducted a telephone survey with 348 (66%) of 530 veterans with SCI who received care from one regional Department of Veterans Affairs SCI center during a 3 yr period. The short-form McGill Pain Questionnaire was used to assess qualitative properties of the pain experience. Other questions were used to assess frequency, duration, intensity, exacerbating factors, and effects on daily activities. Of the participants, 75% reported at least one chronic pain component. The majority (83%) of the chronic pain components occurred daily (mean = 27.4 d/mo) and lasted most of the day (mean = 17.4 h/d). Mean pain intensity in the week before the interview averaged 6.7 (on a 0 to 10 scale), while worst pain intensity averaged 8.6. Two-thirds (67%) of the chronic pain components interfered with daily activities. The most commonly selected pain descriptors were “aching,” “sharp,” “hot-burning,” and “tiring-exhausting.” More research is needed to identify better ways to prevent, assess, and treat chronic pain in the veteran SCI population.

Key words: adult, chronic, female, intractable pain, male, prevalence, spinal cord injury, survey, telephone, veterans.

INTRODUCTION

Based on eight studies published between 1985 and 1999 on pain following spinal cord injury (SCI), Siddall and Loeser estimated that 65 percent of persons with SCI experience pain [1]. In six, more recent reports (1998–2003), estimates of the prevalence of pain in persons with SCI ranged from 75 to 81 percent [2–7]. Specifically,

1,135 (77.4%) of the total 1,467 participants experienced pain. Four of the studies used mailed surveys, one used telephone interviews with a research nurse, and one used in-person interviews with an anesthesiologist. Three of the studies were conducted in the United States and one each in Australia, Denmark, and the United Kingdom. Despite these differences in location and method, the reports of prevalence of pain were similar.

While recent studies have reported similar prevalence of pain, the characteristics of pain reported have varied considerably. Time from SCI to pain onset has ranged from immediately after the SCI to 10 or more years postinjury [2,5,8–9]. Time since pain onset has ranged from less than 1 year to more than 10 years [7]. Many persons with SCI experience pain almost everyday, often

Abbreviations: ANOVA = analysis of variance, K-W = Kruskal-Wallis, MEDVAMC = Michael E. DeBakey Department of Veterans Affairs Medical Center, SCI = spinal cord injury, SCI/D = SCI or dysfunction, SD = standard deviation, SF-MPQ = short-form McGill Pain Questionnaire, VA = Department of Veterans Affairs.

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with little or no break during the day, while others only experience pain periodically [4,8]. Severity of pain has been measured with verbal scales (e.g., mild, moderate, severe) and with numerical scales (e.g., 0 to 10, 0 to 100, 1 to 5). Using verbal scales, 39 percent of the participants in one study [7] and 58 percent in another [2] reported severe pain. On numerical scales, average pain intensity has ranged from 41 to 59 percent of the maximum score (e.g., 41/100, 4.1/10), while pain at its worst has ranged from 72 to 82 percent of the maximum score [4–6,9–10]. The relationship between verbal and numerical rating scales has indicated that ratings of 1 to 4 on either scale correspond to mild pain, 5 to 6 to moderate pain, and 7 to 10 to severe pain [11–12]. Reported exacerbating factors have included muscle spasms, activity, touching the area where the pain occurs, and cold weather [7].

The prevalence of chronic pain specifically in veterans with SCI has not been previously reported. Determination of the prevalence, severity, and characteristics of chronic pain experienced by veterans with SCI who receive healthcare from Department of Veterans Affairs (VA) facilities is important in the planning of services and future research efforts. One cannot assume that findings regarding chronic pain in nonveterans apply to veterans, particularly veterans who receive healthcare from VA facilities. Evidence suggests that veterans are more likely than nonveterans to have psychiatric disorders [13], be homeless [14], smoke [15–16], and drink heavily [17–19]. Furthermore, veterans who receive at least some of their healthcare from a VA facility have been found to be socioeconomically disadvantaged and to have poorer health than veterans who receive all of their healthcare elsewhere [20]. A large study found that elderly men treated for acute myocardial infarction at VA hospitals were more likely to have coexisting conditions, including hypertension, chronic obstructive pulmonary disease or asthma, and diabetes, than comparable Medicare patients treated at non-VA hospitals [21]. Thus, one could argue that the characteristics of chronic pain in veterans with SCI in general and in veterans who seek healthcare from VA facilities in particular differ from those reported in the literature on nonveterans and/or veterans who receive care from non-VA facilities.

To our knowledge, only one other study has been published exclusively on the prevalence and characteristics of chronic pain in U.S. veterans with SCI or dysfunction (SCI/D). Gironda and colleagues found that 81 percent of veterans with paraplegia reported chronic pain in a mailed survey [22].

The current study assessed various facets of chronic pain in veterans with SCI/D at any level of injury who received healthcare from one VA SCI center during a 3-year period. Key questions to be answered included—

1. What is the prevalence of chronic pain in veterans with SCI/D?
2. How long after the onset of SCI/D does chronic pain begin and how long has it been since it began?
3. How frequently does chronic pain occur, how long does it last, and how does it affect daily activities?
4. Are there certain times of day, activities, and/or situations during which chronic pain begins or is at its worst?
5. How severe is chronic pain on average and at its worst?
6. What words describe chronic pain?
7. What areas of the body are affected by chronic pain, and how are those areas related to the level of the SCI/D?
8. How does chronic pain vary depending on its location relative to the level of SCI/D?

METHODS

Sample

Our sampling frame was the 530 veterans with SCI/D who received healthcare during fiscal years 1999 to 2001 at the SCI Center of the Michael E. DeBakey VA Medical Center (MEDVAMC) in Houston, Texas. The MEDVAMC SCI Center provides SCI rehabilitation, primary care, and SCI specialty (medical and surgical) healthcare to veterans who are served by the South Central VA Healthcare Network and are residents of southeast Texas, Arkansas, northern Florida, Louisiana, Mississippi, and Oklahoma. From the original sampling frame, 348 veterans (345 men, 3 women) participated. Of the 182 who did not participate, 22 were deceased, 29 refused, and 110 were unable to be located despite our repeated attempts to contact them directly as well as through their identified next of kin. In addition, 21 were unable to participate for a number of reasons (8 had no help using the telephone, 5 had dementia, 3 were unable to speak, 3 were ventilator-dependent and unable to complete the lengthy telephone interview, 1 was comatose, and 1 was out of the country). Women were underrepresented among the participants (participants = 0.9% female [$n = 3$], nonparticipants = 3.8% female [$n = 7$], $\chi^2 = 5.75$, Fisher's exact test $p < 0.04$).

The participants and nonparticipants did not significantly differ in age, race/ethnicity, or level and completeness of injury. The characteristics of the sample are displayed in **Table 1**.

Procedures

From May 2001 to June 2002, an attempt was made to contact and interview by telephone all 530 veterans in the sampling frame. If potential participants were unreachable by telephone, letters were sent to their last known address asking them to contact the research staff. Once in contact by telephone and prior to data collection, the study was explained, the veteran's questions were answered, and oral consent was obtained if the person wished to participate. A structured interview was conducted, and data were entered directly into the computer with commercially available survey software (Survey-View[®], Ville Platte, Louisiana). The interview began during the recruitment telephone call or was scheduled for another time. The interview was conducted in more than one session if the participant became fatigued or could not continue for some other reason. After the survey was completed, checks for \$10 were sent to participants reporting no chronic pain and for \$25 to participants reporting at least one chronic pain. This payment scheme compensated participants with chronic pain for the longer time needed to answer additional questions about their pain. Prior to completing the survey, participants were told neither the exact amount of payment they would receive nor that the amount depended on whether they had chronic pain. Study procedures were approved by the appropriate institutional review boards and all data were collected in compliance with the standards of these boards.

Measures

Demographic and Injury-Related Data

Information regarding age, sex, race/ethnicity, education, income, age at onset of SCI/D, time since onset of SCI/D, and etiology of SCI/D was obtained during the interview. The level and completeness of SCI/D were obtained from the medical records.

Pain Data

Frequent Pain, Chronic Pain, and Time after Injury to Pain Onset. Participants were asked if they had frequent pain. If so, they were asked how long they

Table 1.
Characteristics of the study sample.

| Characteristic | Value |
|------------------------------------------------|-----------------|
| Age (yr) | |
| Mean \pm SD | 54.8 \pm 11.6 |
| Median | 53.9 |
| Range | 23–84 |
| Age at Onset (yr) | |
| Mean \pm SD | 37.3 \pm 13.8 |
| Median | 34.5 |
| Range | 19–77 |
| Time Since Onset (yr) | |
| Mean \pm SD | 17.5 \pm 12.0 |
| Median | 16.1 |
| Range | 0.3–60.0 |
| Sex, <i>n</i> (%) | |
| Male | 345 (99.1) |
| Female | 3 (0.9) |
| Race/Ethnicity, <i>n</i> (%) | |
| Caucasian | 210 (60.3) |
| African American | 122 (35.1) |
| Hispanic | 13 (3.7) |
| Native American | 2 (0.6) |
| Other (unspecified) | 1 (0.3) |
| Education, <i>n</i> (%) | |
| Less than high school | 36 (10.3) |
| High school or GED | 110 (31.6) |
| Some college or trade school | 121 (34.8) |
| Associate's degree | 25 (7.2) |
| Bachelor's degree or higher | 56 (13.1) |
| Income, <i>n</i> (%) | |
| <\$15,000 | 81 (23.3) |
| \$15,000 to \$24,999 | 59 (17.0) |
| \$25,000 to \$49,999 | 43 (12.4) |
| \geq \$50,000 | 33 (9.5) |
| Not reported | 132 (37.9) |
| Level and Completeness of Injury, <i>n</i> (%) | |
| High tetraplegia (ASIA A, B, or C) | 26 (7.5) |
| Low tetraplegia (ASIA A, B, or C) | 86 (24.7) |
| Paraplegia (ASIA A, B, or C) | 133 (38.2) |
| All ASIA D and E | 95 (27.3) |
| Not applicable* | 8 (2.3) |
| Etiology, [†] <i>n</i> (%) | |
| Motor vehicle crash | 130 (37.4) |
| Violence | 63 (18.1) |
| Sports | 18 (5.2) |
| Fall | 53 (15.2) |
| Flying or falling object | 8 (2.3) |
| Other [‡] | 75 (21.6) |

*Includes cervical spondylosis, cauda equina, central cord syndrome, and multiple sclerosis.

[†]Etiology was missing for one participant.

[‡]Includes health problems such as abscess, stroke, or meningitis; occurrences such as explosions, aircraft accidents, and surgery; and causes unknown to participant.

ASIA = American Spinal Injury Association (impairment classification A, B, C, D, E), GED = General Educational Development (high school equivalency diploma test), SD = standard deviation.

had been experiencing their worst pain. A chronic pain component could encompass more than one area of the body if the pain was in all areas at the same time, under the same circumstances, and described as one pain by the participant. Chronic pain was defined by the presence (continuous or intermittent) of an individual pain component for at least 6 months. Participants reported each frequent pain in descending order of severity. Additional questions were asked about each chronic pain component. Participants were asked how long after their SCI/D each chronic pain component began.

Days and Hours with Pain. For each chronic pain component, participants were asked how many days out of the past month they had experienced that pain and, on those days, how many hours on average they experienced the pain.

Perceived Effect of Pain on Daily Activities. Participants were asked whether each chronic pain had interfered with their normal daily activities none, some, or a lot during the past month.

Time of Day Pain Begins and Is Worst. Participants were asked whether each chronic pain component usually began at a certain time of day. If so, they specified morning, afternoon, evening, or night. A similar question was asked regarding the time of day when the chronic pain component was at its worst.

Activity or Situation Related to Beginning of Pain and Pain at Its Worst. For each chronic pain component, participants were asked whether some activity or situation seemed related to when the pain began or was at its worst. If so, they described that activity or situation in their own words (i.e., no checklist was used).

Average Pain Intensity and Pain Intensity at Its Worst. On a scale from 0 (no pain) to 10 (worst possible pain), participants were asked to rate their average chronic pain during the past week. Using the same scale, they were then asked to rate this pain when it was at its worst.

Short-Form McGill Pain Questionnaire. The short-form McGill Pain Questionnaire (SF-MPQ) was used to determine the properties of the pain experience [23]. Participants indicated whether each of 15 words (e.g., “throbbing,” “shooting,” “hot-burning”) described their chronic pain component. If so, they then rated the intensity of that pain quality as 0 (none), 1 (mild), 2 (moderate), or 3 (severe). Two subscale scores (affective and sensory) were computed by separately summing ratings for the four affective words and eleven sensory words. A total

score was computed by summing the ratings across all 15 items. Correlation coefficients between the short and long forms of the MPQ range from $r = 0.62$ to 0.90 [24]. The SF-MPQ has been found to reflect the analgesic effects of drugs administered for labor pains, musculo-skeletal pain, and postsurgical pain.

Area of Body Affected and Relation to Level of Injury

Participants were asked to describe in their own words the area(s) of the body in which each chronic pain component occurred. These descriptions were then grouped into six mutually exclusive categories:

1. All or most of body: Pain extends down from the neck or upper trunk and involves at least one lower limb, or pain does not occur in the neck or upper trunk but involves at least one upper and one lower limb.
2. Trunk: Pain includes part of the trunk and may include the head and neck but does not involve any limbs or only the back.
3. Upper limbs: Pain includes at least one upper limb and may include the upper back and neck but no other part of the trunk.
4. Back only: Pain does not involve any area of the body except for the back.
5. Lower body: Pain extends down from the waist (no higher) and involves some lower limbs.
6. Lower limbs only: Pain includes at least one lower limb and no other area of the body.

One of the physician investigators later determined the relation of the area(s) of pain to the level of injury and categorized the relations as above level only; above and at level; above, at, and below level; at level only; at and below level; or below level only.

Data Analysis

Descriptive statistics, including mean, median, standard deviation (SD), and range for continuous variables, and number and percentage for categorical variables, were obtained for each study variable. Subscale (affective and sensory) and total scores were computed for the SF-MPQ. The distribution of the area(s) where pain occurred relative to the level of injury was obtained for the entire sample of chronic pain components, as well as separately for participants with tetraplegia and paraplegia. The difference was assessed with a chi-square analysis.

Kruskal-Wallis (K-W) one-way analysis of variance (ANOVA) was performed to identify associations between the pain-related continuous study variables and—

1. Time after SCI/D to onset of pain, recoded into early (<1 year), middle (1 to 10 years), and late (>10 years) onset.
2. Duration of pain, recoded into 6 months to 5 years, >5 years to 15 years, and >15 years.
3. Area(s) of the body affected by pain relative to the level of the SCI/D.

Nonparametric K-W analyses were selected because several study variables were not normally distributed. Chi-square analysis was performed to identify associations of the three variables (time-to-onset, duration, area of body) with each other, as well as with the 15 SF-MPQ descriptive words, regardless of intensity (i.e., selected versus not selected). The associations of the three-category time-to-onset and duration variables with area of the body affected by pain were also assessed with chi-square analyses.

RESULTS

Eighty-one percent (283/348) of the participants reported at least one frequent pain component. Eighteen of these participants reported pain components that had lasted less than 6 months and therefore did not meet the criteria of chronic pain. Thus, 76 percent (265/348) of the participants reported at least one chronic pain component. These 265 participants reported a total of 300 chronic pain components, an average of 1.1 components per person. Specifically, 229 participants (86%) reported one chronic pain component, 32 (12%) two components, and 4 (2%) three components.

The distribution of the time from the SCI/D to the onset of the chronic pain component is displayed in **Figure 1**. These data were recoded into three categories:

1. Early Onset: <1 year (35% of chronic pain components).
2. Middle Onset: 1 to 10 years (28% of chronic pain components).
3. Late Onset: >10 years (37% of chronic pain components).

This three-category code was examined for relationships with other study variables. The only significant relationships identified were with the SF-MPQ descriptors “stabbing” and “cramping.” For middle-onset chronic pain components, “stabbing” and “cramping” were more likely to be selected than for early- or late-onset components (“stabbing”: early = 41%, middle = 63%, late = 55%, $\chi^2 =$

9.19, $p = 0.01$; “cramping”: early = 33%, middle = 57%, late = 41%, $\chi^2 = 10.49$, $p = 0.005$). Time from injury to onset of pain was not related to days with pain in the past month, hours with pain per day, average or worst pain intensity, the total or subscale scores of the SF-MPQ, area of the body with pain, area of pain relative to the level of injury, or the other 13 descriptors from the SF-MPQ.

The distribution of the duration of the chronic pain components is presented in **Figure 2**. Duration of pain was significantly related to area(s) of the body in which pain occurred ($\chi^2 = 19.38$, $p = 0.036$). Notably, pains occurring only in the lower limbs and only in the back were more common as duration increased, while pains occurring in the upper limbs and trunk were less common as duration increased. Duration of pain was also significantly related to the SF-MPQ descriptor “fearful,” indicating that chronic pain components that had been experienced for a longer time were less likely to be described as “fearful” (6 months to 5 years = 26% of chronic pain components, >5 to 15 years = 19%, >15 years = 13%, $\chi^2 = 6.08$, $p = 0.048$).

During the past 30 days, 83 percent of chronic pain components were experienced every day (mean = 27.4 days, median = 30.0, range = 1–30) and on days when pain

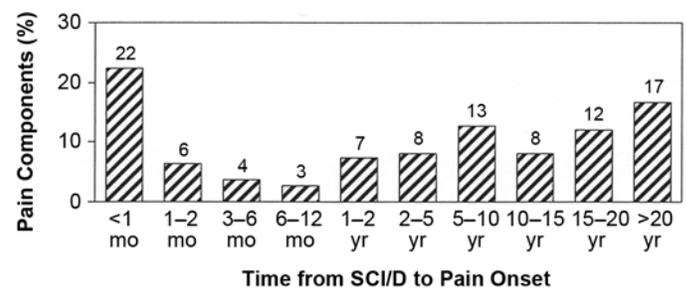


Figure 1.

Distribution of time after spinal cord injury or dysfunction (SCI/D) to onset of chronic pain components.

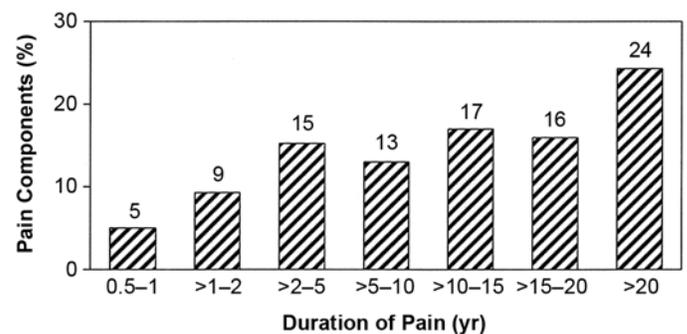


Figure 2.

Distribution of time since onset of chronic pain components.

occurred, 60 percent of the chronic pain components lasted 24 hours (mean = 17.4 hours, median = 24, range = 1–24). The majority (67%) of the chronic pain components were reported to interfere with daily activities. Of the 300 chronic pain components, 38 percent were reported to interfere a lot with daily activities and 29 percent somewhat. Nineteen percent (57/300) of the chronic pain components usually began at a particular time of day: 74 percent (42/57) in the morning, 3 percent (2/57) in the afternoon, 14 percent (8/57) in the evening, and 9 percent (5/57) at night. One-third (100/300) of the chronic pain components were at their worst at a particular time of day: 28 percent (28/100) in the morning, 11 percent (11/100) in the afternoon, 37 percent (37/100) in the evening, 23 percent (23/100) at night, and 1 percent (1/100) in both the morning and afternoon. Of the chronic pain components, 59 percent (178/300) began or were at their worst in relation to one or more activities or situations; 215 activities or situations were reported: * 39 percent moving or being active (83/215), 15 percent not moving for a while (32/215), 10 percent sitting or lying in certain positions (21/215), 18 percent particular types of weather or changes in the weather (38/215), and 19 percent miscellaneous (e.g., bowel and bladder issues, being touched, and stress; 41/215).

On a scale from 0 to 10, the mean pain intensity for the past week was in the high-moderate to severe range (mean = 6.7 ± 2.2 SD, median = 7.0, range = 1–10, **Figure 3**) as defined by Jensen et al. [12], while the mean intensity rating when the pain was at its worst was in the severe range (mean = 8.6 ± 1.8 SD, median = 9.0, range = 3–10, **Figure 4**). The distributions of these ratings were skewed such that higher ratings were more likely than lower ones, particularly for pain at its worst.

The mean total score on the SF-MPQ was 17.0 ± 10.2 SD (median = 15, range = 0–45). The mean score was 3.4 ± 3.5 SD on the affective subscale (median = 2, range = 0–12) and 13.6 ± 7.6 SD on the sensory subscale (median = 13, range = 0–33). The most frequently selected descriptors of reported chronic pain components, irrespective of intensity ratings, were “aching,” “sharp,” “hot-burning,” and “tiring-exhausting” (**Figure 5**). The same four words had the highest mean scores on the 0 to 3 intensity scale (i.e., none to severe) (**Figure 6**). Least likely to be reported as severe were “fearful” (9%), “sickening” (10%), and “gnawing” (11%).

*Percentages sum to 101% due to rounding.

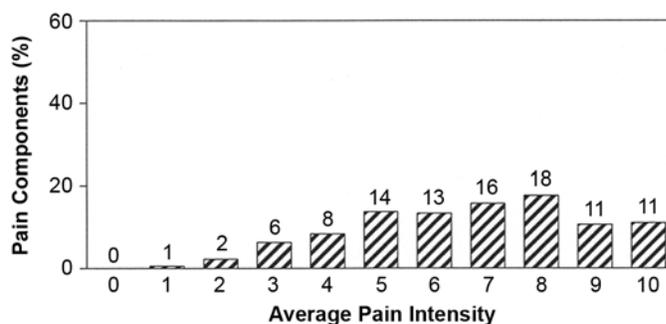


Figure 3. Distribution of participant pain intensity ratings for average pain in past week. Scale: 0 (no pain) to 10 (worst possible pain).

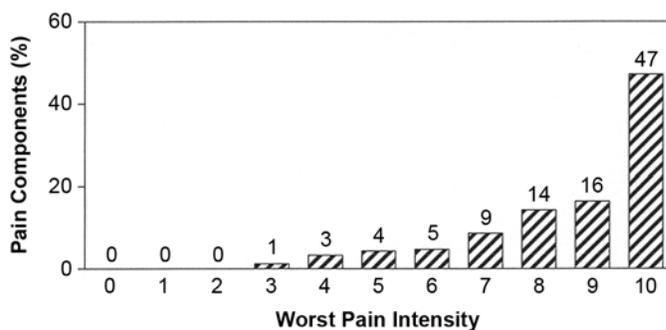


Figure 4. Distribution of participant pain intensity ratings for pain at its worst. Scale: 0 (no pain) to 10 (worst possible pain).

The chronic pain components were distributed approximately equally across the six derived categories for area(s) of the body in which pain occurred (**Figure 7**). The majority (232/300, 77%) of the chronic pain components occurred at and/or below the level of the SCI/D lesion (i.e., the sum of “below level only,” “at level only,” and “at and below level” in **Figure 8**). The area of pain relative to the level of injury could not be determined for 17 (5.7%) of the chronic pain components based on the survey data. For example, if a participant with a thoracic injury stated that the pain was in his back without specifying lower, middle, or upper back, whether the pain was above, at, below the level of injury, or some combination of those areas was indeterminable.

The body areas affected by pain relative to level of injury differed significantly between participants with tetraplegia and paraplegia ($\chi^2 = 27.85$, $p < 0.001$, **Figure 9**). Participants with tetraplegia were more likely to have pain below the level of injury and less likely to have

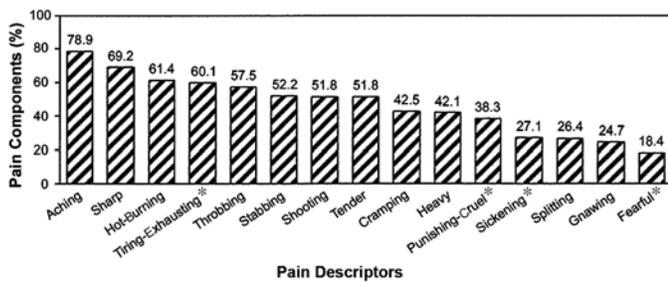


Figure 5.

Frequency of selection of pain descriptors on short-form McGill Pain Questionnaire, irrespective of intensity. * Affective; all others are sensory.

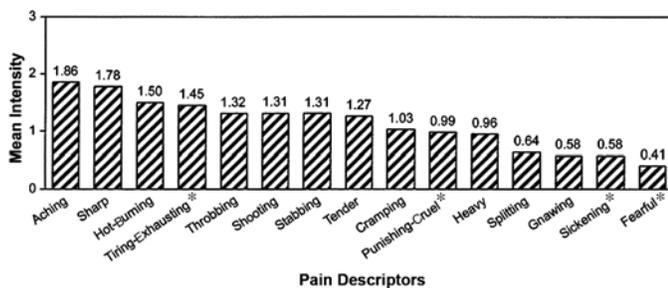


Figure 6.

Mean intensity ratings associated with pain descriptors on short-form McGill Pain Questionnaire. * Affective; all others are sensory. Scale: 0 (none), 1 (mild), 2 (moderate), 3 (severe).

pain above the level of injury. Pain at the level of injury was equally likely.

K-W ANOVAs, in which the 17 undetermined chronic pain components were excluded, indicated that, based on the body area in which pain occurred relative to the level of injury, there were significant differences in hours with pain on days with pain (K-W $\chi^2 = 13.2$, $p < 0.03$), average pain intensity in the past week (K-W $\chi^2 = 15.0$, $p < 0.01$), and pain intensity when pain was at its worst (K-W $\chi^2 = 11.6$, $p < 0.04$). A trend was also seen for the total SF-MPQ score (K-W $\chi^2 = 9.5$, $p < 0.10$). These analyses indicated that pains simultaneously occurring in all three areas (above, at, and below the level of injury) had the highest rank in all pain measures except average pain intensity in which it had the second-highest rank (**Table 2**). Pains that occurred both at and below the level of injury were ranked second highest overall. Pains that occurred above and at the level of injury were ranked lowest overall.

Chi-square analyses indicated that the body area in which the chronic pain component occurred relative to the

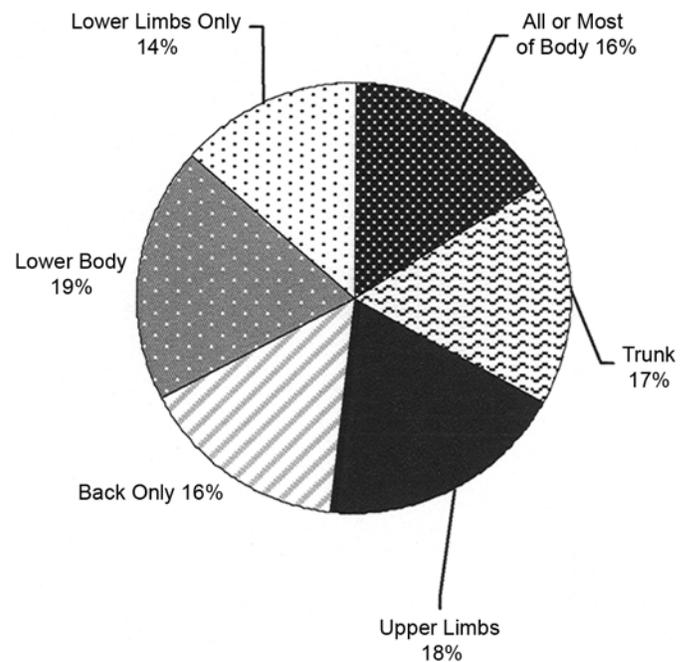


Figure 7.

Areas of body in which chronic pain occurs. Areas derived from participants' descriptions of pain. Clockwise: All or most of body = pain extends down from neck or upper trunk and involves at least one lower limb, or pain does not occur in neck or upper trunk but involves at least one upper and one lower limb. Trunk = pain includes part of trunk and can include head and neck but does not involve any limbs or only back. Upper limbs = pain includes at least one upper limb and can include upper back and neck but no other part of trunk. Back only = pain does not involve any area of body except for back. Lower body = pain extends down from waist (no higher) and involves some lower limbs. Lower limbs only = pain includes at least one lower limb and no other area of body.

level of injury was significantly related to two descriptors from the SF-MPQ: "shooting" ($\chi^2 = 16.45$, $p = 0.006$) and "hot-burning" ($\chi^2 = 13.75$, $p = 0.017$) (**Figure 10**). "Shooting" was selected for all but one chronic pain component that occurred in all three areas of the body relative to the level of injury (above, at, and below). "Hot-burning" was selected most frequently for chronic pain components that occurred both at and below injury.

DISCUSSION

Prevalence of Chronic Pain

This study is unique because it focused exclusively on the prevalence and characteristics of chronic pain in veterans with SCI/D (regardless of level of injury) who received

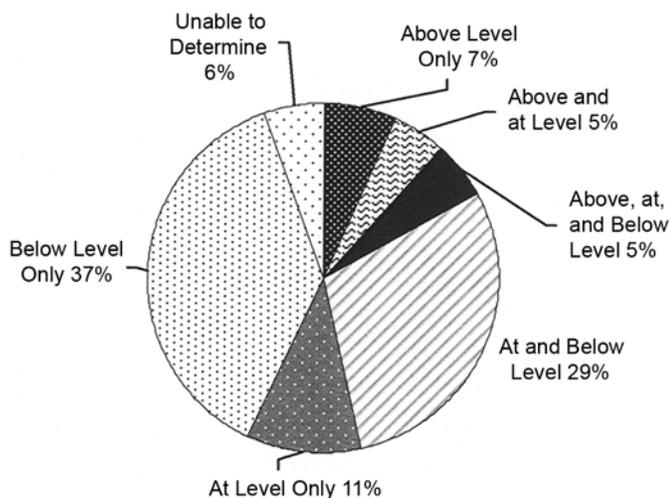


Figure 8. Distribution of body area(s) affected by chronic pain components relative to level of spinal cord injury or dysfunction. Areas derived from participants' descriptions of pain.

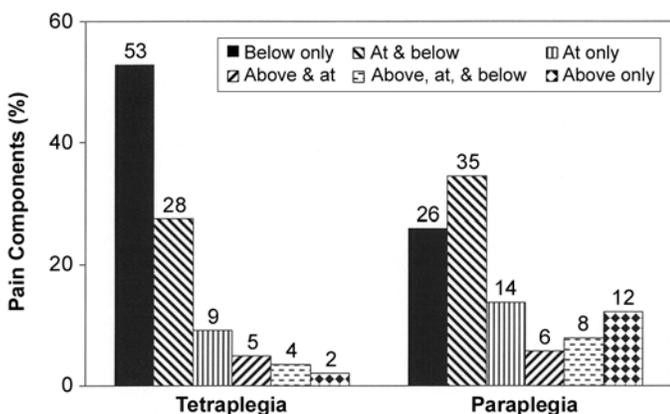


Figure 9. Separate distributions of body area(s) affected by chronic pain components relative to level of spinal cord injury or dysfunction for persons with tetraplegia and paraplegia. Areas derived from participants' descriptions of pain.

care from a VA healthcare facility. The findings are important because the VA needs accurate information regarding health problems specific to the large SCI/D population that it serves. The prevalence of chronic pain (>6 months) was 76 percent, which is within the range of 75 to 81 percent reported across six recent studies [2–7]. This similarity is somewhat surprising because in those six studies the average participant age ranged from 37 to 43 years compared with 55 years in our study, the average time since onset of SCI/D ranged from 5 to 13 years compared with 18 years in our study, and all but one study included 18 to 30 percent

women compared with 1 percent in our study. The differences in sex distribution possibly offset the differences in age and time since injury because women with SCI/D are more likely to report having pain [25], while younger persons with SCI/D [26–27] and persons with SCI/D between 5 and 20 years postinjury [28] are less likely to report having pain.

Onset and Duration of Chronic Pain

More than one-third of the chronic pain components began in the first year following SCI/D, with the majority beginning in the first month. On the other hand, more than one-third of the chronic pain components also began 10 years or more following SCI/D. This large range of time from SCI/D to pain onset is similar to Barrett et al.'s study in which 47 percent of pains began in the first year after SCI/D and 27 percent began 10 or more years after SCI/D [9].

Ravenscroft et al. reported that 18 percent of their sample had experienced chronic pain for more than 10 years [7]. In our study, 57 percent had experienced chronic pain for more than 10 years. In part, the difference in duration of pain may be a function of the maximum time since injury for study participants, which was 38 years in the Ravenscroft et al. study and 60 years in our study.

Severity of Pain

The average severity rating of pain during the past week reported by our sample (67% of maximum score) was higher than mean pain severity rating in other studies (range of 41% to 59% [4–6,8–9]). Similarly, the severity rating when the pain was at its worst was somewhat higher in our sample (86% of maximum score) than in other studies in which only a minority of participants were veterans (73% and 83% [6,8]).

In short, our veteran sample was just as likely to have chronic pain as several nonveteran samples with SCI; however, the veterans' average and worst pains were more likely to be severe. Most chronic pain components occurred nearly everyday for many hours and interfered in daily activities. The association between chronic pain and a poorer quality of life is well documented [29–31], and two-thirds of the veteran sample reported that pain interfered with daily activities. Chronic pain can incur considerable healthcare costs due to increased use of healthcare facilities and services as well as the cost of medication and other pain treatments [32–33]. Furthermore, chronic pain may reduce or prohibit participation in productive activities [31–32].

Table 2.

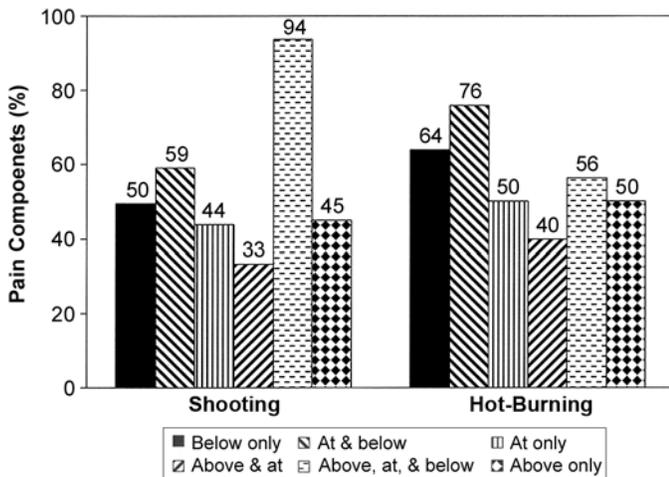
Areas of body in which chronic pain occurs relative to level of spinal cord injury or dysfunction by selected pain measures. Areas derived from participants' descriptions of pain.

| Pain Measure | Above, At, and Below | At and Below | Above Only | Below Only | At Only | Above and At |
|-------------------------|----------------------|--------------|------------|------------|---------|--------------|
| Days with Pain* | 1 (155) | 2 (147) | 4 (130) | 3 (143) | 5 (127) | 6 (126) |
| Hours with Pain* | 1 (169) | 2 (159) | 6 (120) | 5 (130) | 4 (131) | 3 (155) |
| Average Pain Intensity* | 2 (154) | 1 (164) | 6 (101) | 5 (130) | 4 (133) | 3 (149) |
| Worst Pain Intensity* | 1 (188) | 2 (154) | 6 (123) | 3 (134) | 5 (129) | 4 (130) |
| SF-MPQ Total* | 1 (175) | 3 (153) | 2 (153) | 4 (128) | 5 (128) | 6 (123) |
| SF-MPQ Affective Scale* | 1 (175) | 2 (154) | 3 (151) | 5 (130) | 4 (131) | 6 (120) |
| SF-MPQ Sensory Scale* | 1 (165) | 3 (149) | 2 (151) | 5 (132) | 4 (134) | 6 (125) |
| All Pain Measures† | 1.14 | 2.14 | 4.14 | 4.29 | 4.43 | 4.86 |

*Order (mean rank).

†Average order.

SF-MPQ = short-form McGill Pain Questionnaire.

**Figure 10.**

Frequency of selection of short-form McGill Pain Questionnaire pain descriptors "shooting" and "hot-burning" by area of body in which pain occurs relative to level of spinal cord injury or dysfunction. Areas derived from participants' descriptions of pain.

Limitations of the study include the very small number of women and their underrepresentation relative to the sampling frame, the nonparticipation of one-third of the sampling frame, and the use of data self-reported in a telephone survey. Nevertheless, the sample was reasonably large and, with the exception of sex, the participants and nonparticipants did not differ significantly on the available demographic and injury-related data.

Despite obtaining large amounts of information on chronic pain in our sample of veterans with SCI/D, we were unable to classify the pains by type (e.g., neuropathic, musculoskeletal, visceral) based solely on the sur-

vey data. Because the survey was done over the telephone, we were unable to indicate the area(s) of chronic pain on body diagrams as is commonly done during in-person interviews or with mailed surveys. Furthermore, if a participant reported leg pain, for example, we did not ask whether the pain was in one or both legs. Thus, diffuse pain (a characteristic of neuropathic pain) was difficult to determine. In some cases (5.7%), the relationship of the area of the pain relative to the level of injury (an important factor in classification of neuropathic pain) was impossible to determine. In 2002, Cardenas et al. described a classification scheme that accounts for the location of the pain relative to the level of injury by use of (1) shaded portions of a body diagram, (2) level and completeness of injury, and (3) participant self-reports of the effects of activity, position, and light touch on the pain; source of pain (musculoskeletal or nervous system); and exacerbating factors [34]. Unfortunately, our survey instrument was developed and our data collected before their study was published, so we could not benefit from their methodology. In future telephone surveys of chronic pain, participants who reported having chronic pain could be sent a body diagram to complete for each reported chronic pain component. They could be asked to shade in the areas of the body affected by each chronic pain component and then return the diagram by mail.

CONCLUSIONS

The VA provides healthcare to 15,000 veterans with SCI each year [35]. Extrapolating from our finding that

76 percent of veterans with SCI/D have chronic pain, we estimate that 11,400 veterans with SCI/D who receive care from the VA have chronic pain requiring assessment and ongoing treatment and 6,270 have severe chronic pain (i.e., intensity rating of ≥ 7 on a 0 to 10 scale) on average during the week [12]. Furthermore, based on our finding that half of the veterans with SCI/D were injured more than 16 years ago and half were over the age of 53 at the time of our study, the prevalence of chronic pain is likely to increase in the national veteran SCI/D population due to aging and increasing time since injury. Policy and program planners need to be aware of the high prevalence and severity of chronic pain among veterans with SCI/D who receive healthcare at VA facilities.

We anticipate publishing future papers based on additional information obtained during our study, including the relation of chronic pain to—

1. Demographic data.
2. Injury-related data.
3. Activities and participation.
4. Environmental factors.
5. Psychosocial factors.
6. Reported treatments and their perceived effectiveness.
7. Satisfaction with the pain-related care received from healthcare professionals.

The findings of this study suggest that more research is needed to further determine modifiable risk factors for chronic pain (e.g., overuse syndrome) and causes of chronic pain (e.g., poor posture, neuropathic abnormalities). Better assessment (e.g., improved assessment tools, regular monitoring of chronic issues) and better treatment (e.g., more effective medications, procedures, self-management techniques) of chronic pain in veterans with SCI/D are also indicated. The need for such research fits well with the current emphasis on evidence-based medicine [36].

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