
Brief Reports

DAVIDSON TRAUMA SCALE (DTS): NORMATIVE SCORES IN THE GENERAL POPULATION AND EFFECT SIZES IN PLACEBO-CONTROLLED SSRI TRIALS

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The Davidson Trauma Scale (DTS) was developed as a self-rating for use in diagnosing and measuring symptom severity and treatment outcome in post-traumatic stress disorder (PTSD); 630 subjects were identified by random digit dialing and evaluated for a history of trauma. Prevalence rates of PTSD and subthreshold PTSD with impairment were 2.2 and 4.1%, respectively. In this general population sample, 438 subjects endorsed at least one trauma, and four groups were generated: A) threshold PTSD (n = 13), B) subthreshold PTSD with impairment (n = 26), C) subthreshold PTSD without impairment (n = 78), and D) no PTSD (n = 321). Mean (SD) DTS score in the entire population was 11.0 ± 18.1. Differences were found in four of the five pairwise between-group contrasts. In a second sample of 447 clinical trial participants from three SSRI vs. placebo studies, we assessed treatment effect size according to different measures. In all three clinical trials, effect size with the DTS was equal to, or better than, those found for the Impact of Event Scale (IES), Clinician Administered PTSD Scale (CAPS), and Structured Interview for PTSD (SIP). These results further affirm the utility of the DTS as a self-rating measure of PTSD symptom severity and in evaluating treatment response. Depression and Anxiety 15:75–78, 2002. © 2002 Wiley-Liss, Inc.

Key words: Davidson Trauma Scale (DTS); general population; treatment effect size

INTRODUCTION

The Davidson Trauma Scale (DTS) [Davidson et al., 1996] was designed as a new self-rating scale for assessing the severity and frequency of post-traumatic stress disorder (PTSD) symptoms and for assessing treatment outcome. Items in this scale measure the 17 PTSD symptoms found in DSM-IV. It is quick to administer (taking less than 10 min) and has been tested in a variety of populations, inclusive of men and women who have experienced different traumata. It has been translated into several languages and valid psychometric data have recently been reported from Taiwan [Chen et al., 2000]. Each DTS item is measured on a scale of 0–4, for both severity and frequency, such that the maximum possible score is 136. The items can be grouped into intrusion, avoidance, numbing, and hyperarousal symptom clusters, as per separate factor analysis [Chen et al., 2000]. The scale has been used in all major multicenter pharmacotherapy trials known to the authors. Lacking with the DTS at present are normative values from the general population and also indications of effect size in treatment-outcome research. To remedy this lack of information, we are presenting further psychometric evaluation of the scale in two contexts. First, we present DTS scores in a general population of non-treatment seekers who have experienced trauma. Second, with the growing literature on pharmacotherapy

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of PTSD that is now available, we are able to assess the treatment effect size of SSRI vs. placebo with different PTSD-specific scales, including the DTS, in clinical trials of SSRI therapy in PTSD. When one treatment is known to be more effective than another by a reference measure, then the newer scale can be validated if it too demonstrates the same difference. According to whether the magnitude (or effect size) is greater or lesser, the newer scale may be seen as being either more or less satisfactory for the purpose of detecting treatment differences.

**METHODS**

**GENERAL POPULATION**

In the general population sample, 630 subjects were recruited by Random Digit Dialing (RDD), the interviews being conducted by Schulman Ronca Bucuvalas, Inc. (SRBI), a professional survey organization. Of these, 438 had reported at least one trauma. The Trauma Questionnaire (TQ) [Escalona et al., 1997], the Mini International Neuropsychiatric Interview (MINI) [Sheehan et al., 1988], and the DTS were used for assessing trauma, diagnosis, and PTSD symptoms, respectively. The MINI is an internationally validated structured interview for diagnosing all major Axis I disorders. All subjects had experienced at least one trauma, with unexpected death (n = 207), threat (n = 51), and traffic accident (n = 29) being the most common. Four groups were generated as follows: A) DSM-IV threshold PTSD (n = 13) (one additional subject with PTSD did not complete the DTS); sub-threshold PTSD, which required the presence of at least one symptom from each cluster—further classified into B) with impairment (n = 26); C) without impairment (n = 78); and D) no PTSD (n = 321). For the general population data, mean ± SD, as well as medians and interquartile ranges (25th and 75th percentiles), were calculated. Non-parametric Kruskal-Wallis and Wilcoxon rank sum tests [Siegel and Castellan, 1998] were used if distribution of scores was non-normal—as was the case for the general population sample, but this was not the case for the three clinical trial populations. However, for descriptive purposes, mean (± SD) scores are also presented.

**CLINICAL TRIAL POPULATION**

Three study samples were available for pharmacotherapy effect size assessments: A) Fifty-four subjects were recruited for a 12-week placebo-controlled trial of fluoxetine [Connor et al., 1991] in which the DTS and Impact of Event Scale (IES) [Horowitz et al., 1979] were used as self-ratings. The IES is a widely used rating to assess subjective impact of intrusive and avoidant symptoms. The Structured Interview for PTSD (SIP) [Davidson et al., 1989] was used as an interviewer-based scale. B) 187 and 208 subjects were recruited in two identical 12-week studies of sertraline and placebo (sertraline-I and sertraline-II) [Brady et al., 2000; Davidson et al., 2001] in which the DTS and IES were used as self-rating scales, while the Clinician Administered PTSD Scale (CAPS) [Blake et al., 1990] was used as the main interviewer-based assessment. The CAPS rates each of the 17 PTSD symptoms on five point scales for frequency and severity, ranging in score from 0–136. To measure effect size, Cohen’s statistic was used [Cohen, 1998] and the effect size for different scales was calculated, based on the difference in mean endpoint scores for each of the three drug trial samples relative to placebo. According to this method an effect size of ≥ 0.5 is regarded as moderate and one of ≥ 0.8 is considered to be strong.

**RESULTS**

Demographic characteristics of the four samples indicate that the traumatized general population sample (n = 438) was 44.9 ± 15.7 years of age, 62% female and 79% Caucasian. In the sertraline samples (n = 187 and 208), mean ages were a) 40.2 ± 9.6 for sertraline, 39.5 ± 10.6 for placebo, and b) 37.6 ± 11.1 for sertraline, 36.6 ± 10.1 for placebo; 84% and 76% were female, and 83% and 81% were Caucasian.

**GENERAL POPULATION**

The four general population groups differed in their total DTS score, whose mean score ± SD for the whole sample (n = 438) was 11.0 ± 18.1. DTS scores for subgroups were a) for threshold PTSD (n = 13) 64.4 ± 29.7, b) the subthreshold PTSD with impairment (n = 26) 31.9 ± 28.2, c) non-impaired subthreshold PTSD (n = 78) 19.6 ± 16.7, and d) non-PTSD (n = 321) 5.0 ± 8.9. Distribution of scores was non-normal (Shapiro-Wilk’s test, P < 0.0001). The data were thus analyzed by the Kruskal-Wallis test for overall statistical significance (χ² = 144.9, df = 3, P < 0.0001). Pairwise comparisons for four groups were undertaken by means of Wilcoxon rank sum test [Siegel and Castellan, 1998]. These results are shown in Table 1. There was a statistically significant difference (P < 0.05) between the following pairs a) full PTSD vs. no PTSD, b) subthreshold PTSD with impairment vs. no PTSD, c) subthreshold PTSD without impairment vs. no PTSD, and d) subthreshold PTSD without impairment vs. PTSD. There was no statistically significant difference between e) subthreshold PTSD with impairment vs. full PTSD. No significant differences between men and women were noted in DTS scores either in the full population or in the subgroups. No difference was noted in the distribution of men and women in across the four populations, respectively.

**CLINICAL STUDIES**

In the fluoxetine vs. placebo study, treatment effect sizes were as follows: 0.96, 0.46, and 0.91 for the DTS, IES, and SIP, respectively. In the first sertraline vs. placebo study effect sizes were 0.40, 0.35, and 0.31.
TABLE 1. Scores on Davidson Trauma Scale in population groups: median and interquartile (1st, 3rd quartile scores)*

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<thead>
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<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<tbody>
<tr>
<td>Full sample</td>
<td>PTSD</td>
<td>Subthreshold PTSD</td>
<td>Subthreshold PTSD with</td>
<td>No PTSD</td>
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<tr>
<td>(n = 438)</td>
<td>(n = 13)</td>
<td>with impairment (n = 26)</td>
<td>no impairment (n = 78)</td>
<td>(n = 321)</td>
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<tr>
<td>3.3 (0.0, 15.2)</td>
<td>67.1 (48.8, 77.7)</td>
<td>20.5 (11.4, 44.4)</td>
<td>15.3 (8.3, 28.5)</td>
<td>0.0 (0.0, 5.7)</td>
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*Overall sample, Kruskal-Wallis test, $\chi^2 = 144.9, 3$ df, $P < 0.0001$. $P < 0.05, A \geq D; B \geq D; C \geq D; A \geq C$.

DISCUSSION

These findings indicate that in the general population of non-treatment-seeking traumatized individuals, the average DTS score is very low and suggestive of no more than minimal symptoms. The scale does detect a significant gradation of symptoms over the four groups who are identified by the MINI as having increasingly severe symptoms. Although no difference was noted between full and subthreshold PTSD with impairment, this may be a type II error related to small sample size. Subthreshold PTSD, with or without impairment, is associated with DTS scores greater than those of non-PTSD subjects. Stein et al. [1997] found subthreshold PTSD to be prevalent in 3.4% women and 0.3% men, and to cause occupational impairment. Therefore 2–3% of the population appears to have subthreshold (partial) PTSD at a chronically significant level. In our sample (i.e., 438 trauma survivors and 192 non-traumatized subjects), 26 (4.1%) fulfilled criteria of subthreshold PTSD with impairment results, which is very similar to those of Stein et al. [1997]. Dichotomizing people into those with and without PTSD is probably a simplification that obscures the clinical problems and needs of those with some, but not full, symptom criteria of PTSD. The DTS score of those with full PTSD in the community is at the lower end of the range found among individuals entering clinical trials. For example, mean ± SD DTS scores in the fluoxetine and sertraline samples were, respectively, 73.7 ± SD 20.4, 74.5 ± 26.9, and 71.9 ± 24.1. Our data suggest that scores on the DTS can differentiate patients with PTSD and partial PTSD from patients with no PTSD in the general population and provides normative population data, which can be used as a reference point for other studies that use this scale.

For the three drug-trial samples, effect size was calculated and compared with other scales; the DTS was associated with a numerically greater effect size than the IES and was comparable to that of SIP and CAPS. It may usefully serve to detect differences between treatments of differing efficacy.

Future directions with the DTS might include its application as a screening instrument in shorter form for possible PTSD [Meltzer-Brody et al., 1999], its wider use and study in different cultures [e.g., Chen et al., 2000], and its development for children and adolescents. As mirror images, both the DTS and CAPS appear to behave similarly (e.g., comparable scores and changes with treatment). When time is scarce, or resources limited, it may be a useful primary outcome alternative to the more time-consuming clinician interview, but further study of their performances is required.

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REFERENCES


