The Prevalence of Post-traumatic Stress Disorder in Chronic Pain Patients

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Several of the more common causes of chronic pain include traumatic events such as motor vehicle accidents and work-related incidents. Therefore, it is not unusual for patients presenting with chronic pain to also describe significant levels of distress including post-traumatic symptomatology and, in the more severe cases, post-traumatic stress disorder (PTSD). Throughout the past few decades, the literature relating to chronic pain and PTSD has become progressively more sophisticated, resulting in well-supported theories and treatments for sufferers. However, only a handful of studies have specifically attended to the co-occurrence of these two disorders. This review presents a summary of the literature relating to the two disorders in terms of symptoms, prevalence, and comorbidity. It also briefly describes the main empirically supported psychologic theories of chronic pain and PTSD and briefly reviews the evidence regarding what factors maintain the disorders. Treatment implications and issues for future research are considered.

Introduction

As highlighted in a recent review [1•], research into the co-occurrence of post-traumatic stress disorder (PTSD) and chronic pain is surprisingly lacking despite the relatively high incidence of trauma in those who have suffered severe injury and of pain in those who have experienced a traumatic incident. It should be the cause of some concern that the combination is only rarely referred to in the published literature given the substantial overlap between the two disorders [2].

A quick review of two recent comprehensive textbooks on pain highlights this deficit because PTSD is not even mentioned in the index or chapter headings [3,4]. Similarly, in two recent comprehensive texts on PTSD, pain is referred to only very briefly [5,6].

In this article, both disorders are reviewed for the diagnostic criteria, the prevalence rates, and comorbidity and current explanatory theories. Furthermore, mutually maintaining factors are discussed briefly, with a particular focus on clinical implications and areas for future research.

Post-traumatic Stress Disorder: Diagnostic Criteria

The psychologic sequelae of trauma have been recognized for more than a century [7]. In the first and second editions of the Diagnostic and Statistical Manual of Mental Disorders (DSM) [8,9], trauma responses were classified within the anxiety or depressive disorders. The PTSD diagnosis was not introduced as a separate category until the DSM-III [10]. Although the DSM-III did not stipulate a duration for symptoms, the revised version of that edition (DSM-III-R) [11] required that the symptoms be present for more than 1 month after the onset of the trauma, thereby excluding what may have been considered normal acute responses.

More recently, the DSM-IV [12] defined PTSD as involving exposure to a trauma when there was actual or threatened injury to the self or another (Criterion A), along with at least one re-experiencing symptom (Criterion B), three avoidance symptoms (Criterion C), and at least two arousal symptoms (Criterion D). The disturbance must have been present for at least 1 month (Criterion E) and must have caused significant distress (Criterion F). For post-traumatic reactions that manifest within 1 month of the trauma, it is suggested that a diagnosis of acute stress disorder (ASD) be considered. To meet criteria for ASD, an individual must have experienced a stressor identical to that defined by the PTSD criteria (Criterion A), along with at least three dissociative symptoms (Criterion B), one re-experiencing symptom (Criterion C), one avoidance symptom (Criterion D), and one arousal symptom (Criterion E). ASD can be diagnosed within 2 days and 1 month of the trauma (Criterion F) and significant distress occupationally or socially must be caused by the disturbance (Criterion G).

The inclusion of the ASD diagnosis in the DSM-IV was highly controversial. It was purportedly included in recognition of the high levels of distress that can occur in the acute phase post-trauma and because it was assumed to be a predictor of later PTSD [13]. Although there was minimal evidence in support of either proposal at the time of inclusion [14], subsequent research has provided some tentative support [15].

Chronic Pain: Diagnostic Criteria

Despite being used frequently in clinical contexts, chronic pain is not a formal diagnosis. However, pain disorder has been included in the most recent edition of the DSM (DSM-IV) [12]. Before this, earlier editions of the DSM had struggled with complex and poorly defined criteria for diagnoses of somatization disorder, conversion disorder, psychogenic pain disorder, and somatoform pain disorder.

Fishbain [16] reviewed the development of these diagnoses and described the problematic criteria on which earlier diagnoses such as psychogenic pain disorder were based. Among other things, a diagnosis depended on the pain being inconsistent with anatomic distribution, not adequately accounted for by organic pathology or on the pain being considered grossly in excess of that expected from physical findings. Furthermore, a diagnosis of psychogenic pain disorder required that psychologic factors be etiologically related to the development of the pain. The problem with such a definition is that few chronic pain patients are without any organic pathology; however, whether this can always explain the experience reported by the patients is frequently unclear. Furthermore, a diagnosis depended predominately on the clinician making a subjective value judgment regarding the relative importance of the psychologic factors.

Although the DSM-III-R [11] modified the psychologic criteria, the new diagnosis of somatoform pain disorder remained problematic. King and Strain [17] found that the criterion of "preoccupation with pain" was defined poorly, the expectation that clinicians could judge whether or not a patient's pain "exceeded" that which would be expected was considered unreasonable and that iatrogenic factors may influence patients' presentations was not considered. The use of the term somatoform and the possibility that a diagnosis may be interpreted as suggesting that the patient's pain was somehow not real also was considered unsatisfactory.

Therefore, the DSM-IV made a number of changes and the disorder was renamed pain disorder. In this most recent version, to meet criteria for pain disorder, the individual must report pain in one or more parts of the body of sufficient intensity to warrant clinical attention (Criterion A), the pain must cause clinically significant distress or impairment (Criterion B), psychologic factors must be involved (Criterion C), and the pain complaint must not be caused by malingering (Criterion D).

Although considered by some to be an improvement on previous versions, these criteria continue to raise problems for the clinician and diagnostician. Fishbain [16] described the following problems: most chronic pain patients will meet Criterion A and thus the criterion probably is overinclusive; similarly, most chronic pain patients who present for treatment are likely to be distressed or disabled by their pain and thus criterion B also appears somewhat overinclusive; and Criteria C and D resemble those criteria removed from earlier editions of the DSM because of poor reliability and validity and they require value judgments. Taking these arguments in to account, pain disorder (as it is currently defined) provides little in the way of diagnostic use.

Post-traumatic Stress Disorder: Prevalence

The estimated prevalence of PTSD varies across selected samples as follows: 39% in motor vehicle accident (MVA) survivors [18], 39% of assault victims [19], 7% of homicide survivors [20], and 15.2% of male and 8.5% of female Vietnam Veterans [21]. The variation in rates of PTSD reported across trauma groups may be at least partially accounted for by differences among traumatic events. The degree of violation of a person's assumptions of control and safety, the chronicity of the experience, and the level of threat and fear evoked are just a few of the factors that differ across trauma types.

Most trauma survivors will experience at least some degree of psychologic distress after trauma, but most recover with time. For example, following a rape, 64% of victims met criteria for PTSD at 5 weeks and 47% met criteria for PTSD at 11 weeks [22]. Similarly, 50% of a sample meeting criteria for PTSD after an MVA had remitted by 6 months and two thirds had remitted by 1 year post-trauma [18].

The introduction of ASD has permitted and stimulated a series of controlled investigations of acute post-trauma reactions [23]. Consequently, there is evidence that between 13% and 29% of trauma survivors are diagnosed with ASD. Furthermore, ASD appears to mark those vulnerable to the development of subsequent PTSD [15,24,25].

Post-traumatic Stress Disorder: Prevalence in Chronic Pain Patients

Approximately 80% of patients with PTSD meet criteria for at least one other psychiatric diagnosis [26]. The most common comorbid disorders include the mood disorders (*eg*, major depressive disorder), the anxiety disorders, substance abuse disorders [5,27], and somatoform disorders [5].

Research by Barton *et al.* [28] indicates that ASD also is likely to coexist with a range of Axis I and Axis II disorders. Overall, the most widely documented comorbid disorder is depression [29] and it is not uncommon for the depression to be associated with suicidal ideation [30]. However, it is unclear whether trauma causes the range of psychopathology or whether having psychopathology predisposes a person to the development of PTSD [31].

In samples of chronic pain patients, prevalence rates for PTSD have varied considerably depending on the sample studied and the nature of the pain complaint. However, whereas average PTSD prevalence rates in the general population range between 7% and 12%, it would seem as though the prevalence of PTSD in samples of chronic pain patients is substantially higher.

As summarized by Asmundson *et al.* [32••], PTSD symptoms tend to be notably elevated in patients with

chronic pain. More specifically, the authors estimate that of those patients presenting for tertiary level treatment of chronic pain complaints, between 10% and 50% satisfy criteria for PTSD.

These findings are consistent with recent results of a large-scale comorbidity study in which it was found that patients presenting with musculoskeletal symptoms were four times more likely to develop PTSD than those without pain [33].

Post-traumatic Stress Disorder and Chronic Pain: Interactions

Apart from a few notable exceptions that have drawn attention to physical symptoms that are comorbid with PTSD [34–37], comorbidity between chronic pain and PTSD has been neglected. These reports triggered some authors to propose that rather than being distinct disorders, chronic pain and PTSD may be intricately connected [38].

Four studies provide initial evidence that is consistent with this proposal. First, Bryant *et al.* [39] assessed a sample of traumatically brain-injured survivors of an MVA for the presence of pain and found a greater prevalence of chronic pain in those who suffered PTSD.

Second, Beckham *et al.* [38] examined 129 consecutive outpatient combat veterans with PTSD and found that 80% reported chronic pain. These patients were more likely to report higher somatization than veterans with PTSD who did not report chronic pain. Third, McFarlane *et al.* [35] observed that chronic pain was the most common physical complaint in firefighters with PTSD.

Fourth, Benedikt and Kolb [40] found that 10% of veterans in a chronic pain clinic had PTSD. In an outpatient sample of chronic pain patients, 9.5% met diagnostic criteria for PTSD [41] and one out of four patients with PTSD reported a comorbid pain problem [42]. Together, these studies attest to the high comorbidity.

However, positive correlations do not necessarily provide solid proof that a direct causal link exists either way between chronic pain and PTSD. Nevertheless, as described by Sharp and Harvey [1•], there is enough evidence to support the hypothesis that the two disorders are more than likely linked by a number of seven specific mechanisms and that these various mechanisms may lead to pain and PTSD being mutually maintaining.

A summary of these factors is outlined in the next section and is proffered in the hope that it may stimulate testable and useful hypotheses that then will guide future clinically relevant research.

Attentional biases have been found in PTSD [43] and chronic pain [44] patients. In PTSD, the attentional bias is toward threatening stimuli and is toward pain-related stimuli in pain. Heightened expectation and overestimation of probability also are characteristic of both disorders. In chronic pain, the overestimation relates to the probability of experiencing pain and reinjury [45]; in PTSD, it relates to the probability of experiencing the trauma again [46]. For PTSD patients, the sensations of pain may cause discomfort, distress, and disability and may be a reminder of the trauma. As such, PTSD patients may have an attentional bias toward the pain sensation that would lead to amplification of the pain experience.

Anxiety sensitivity is a measure of the tendency toward misinterpreting anxiety symptoms as indicative of harm and the tendency toward anxiety sensitivity in chronic pain and PTSD, which may further fuel a vulnerability to the misinterpretation [35] and catastrophization [47] of the physical sensations associated with pain and the bodily sensations accompanying arousal (a key symptom of the PTSD response).

Previous work with PTSD has highlighted the role of reminders of the trauma in triggering arousal and other PTSD symptoms [48]. Chronic pain may feed into this process by serving as a persistent reminder of the traumatic event. That is, if the sensations of pain are interpreted by the PTSD patient as a reminder of the trauma, they will trigger an arousal response that, in turn, will trigger avoidance of the cause of the pain sensations and of any memories of the trauma that accompany the arousal response. As such, a pattern of mutual maintenance where avoidance of sensations associated with the trauma leads to escalating levels of distress and disability.

Theoretical formulations of both disorders recognize that an avoidant coping style may be adopted because of a desire to minimize pain and anxiety. In both disorders, some avoidance may be protective and adaptive. In pain, avoidance may prevent overexertion that can lead to repeated injury [45]; in PTSD and ASD, avoidance and dissociative strategies after trauma can be adaptive in assisting patients to "find their feet" and to keep them functioning at work and in their social world in the aftermath of the trauma [49]. However, in both disorders, there is evidence that prolonged behavioral and cognitive avoidance is associated with the maintenance of symptoms [50,51]. For pain patients, avoidance leads to physical deconditioning and disability [52]. For PTSD patients, chronic avoidance will prevent the activation and resolution of the fear network leading to the maintenance of intrusive symptoms and the associated arousal [53].

Depression is a common concomitant to chronic pain and PTSD. It is possible that the fatigue and lethargy and associated reduction in activity levels may serve to maintain PTSD and chronic pain. Lack of activity in chronic pain patients is associated with increased disability [52]. In PTSD patients, it may be associated with a lack of exposure to trauma-related stimuli, which are necessary for the processing and resolution of the trauma response [53].

Pain perception is exacerbated by elevated anxiety [54]. Because PTSD is characterized by anxiety [12], it would be expected that PTSD may directly increase pain perception. This may lead to reduced activity levels and increased disability and distress [52].

Cognitive strategies that reduce the perception of pain require some degree of attentional control [55]. However, chronic pain and PTSD are characterized by a high level of

cognitive activity, catastrophic cognitions for pain patients [47], and intrusive re-experiencing of the trauma and catastrophic cognitions for PTSD patients [12,46]. It is likely that these place considerable demands on patients and limit the cognitive capacity left to employ adaptive strategies to effectively control the pain [56].

The cognitive, affective, and behavioral components of chronic pain may exacerbate and maintain the symptoms of and responses to PTSD. At the same time, the physiologic, affective, and avoidance components of PTSD may exacerbate and maintain problems associated with chronic pain.

Implications for Treatment

Chronic pain and PTSD are relatively prevalent, presenting problems. PTSD is one of the diagnoses that occurs more frequently in conjunction with chronic pain. It has been argued that chronic pain and PTSD can be conceptualized as mutually maintaining conditions.

The formulation proposed by Sharp and Harvey [1•] highlights a number of points of intervention with potential to "cut into" the cycle of mutual maintenance. In particular, reduction in cognitive and behavioral avoidance (by in vivo and imaginal exposure) and aiming to increase activity levels are crucial.

To do this most effectively, these two proven and established treatment strategies (*ie*, exposure and pacing/activity scheduling) can be combined. For example, because one of the main goals of exposure strategies (when used with patients with PTSD) is to enter into and confront feared situations, this can be combined with activity pacing, which is an approach that is commonly used as part of most pain management interventions. By doing so, patients presenting with pain and PTSD can simultaneously confront and overcome their fears and engage in activities and exercises from which they will benefit physically.

Specifically, a patient for whom walking is considered beneficial could be encouraged to gradually walk further and further or slowly and gradually walking closer and closer to appropriately chosen anxiety-provoking situations (*eg*, the site of an accident).

In addition, cognitive therapy should be employed to correct attentional biases, challenge overestimation of probability and cost, reinforce positive pain self-efficacy beliefs (*ie*, the patients' confidence that they can get on with things despite ongoing pain), and challenge catastrophizing. There is no practical reason why the general approach to identifying and challenging negative, unhelpful thoughts would or should differ depending on whether those thoughts were anxiety- or pain-related.

With this in mind, it is suggested that throughout the treatment of comorbid chronic pain and PTSD, there should be an emphasis on helping patients see links between their chronic pain problem and their post-traumatic symptomatology and to simultaneously apply cognitive and behavioral strategies to both problems.

This approach, originally recommended by Sharp and Harvey [1•], subsequently has been supported (mostly) by others. Although they question some of the theoretical premises of the model proffered by Sharp and Harvey [1•], Asmundson *et al*. [32••] agree that "when PTSD and pain symptoms co-occur, it is likely that clinicians will be required to modify treatment protocols accordingly." In particular and in addition to standard treatment protocols for the two separate disorders, they emphasize the importance of considering the use of strategies aimed specifically at reducing anxiety sensitivity, probably through introspective exposure.

Conclusions

Physicians, including the author of this paper, who have attempted to address this complex area agree that PTSD and chronic pain commonly occur together, that when they do occur together, interventions need to carefully consider the role of mutually maintaining factors or shared vulnerabilities, and that traditional treatments will be most effective if they are adjusted appropriately and adequately to take the aforementioned common factors into account. Furthermore, it is widely acknowledged that there are numerous opportunities for further research in this and other areas where patients present with more than one psychologic disorder.

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