Comorbid chronic pain and post-traumatic stress disorder in UK veterans: a lot of theory but not enough evidence

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Abstract

Introduction: Chronic pain and post-traumatic stress disorder (PTSD) are strongly correlated in military veteran populations. The aim of this article is to review what is known about the comorbidity of the two conditions.

Methods: A literature search was carried out to establish evidence for current explanatory models of why the two conditions frequently co-occur, the most appropriate treatments and current UK service provision for veterans and to identify gaps in research.

Results: Chronic pain and PTSD share a number of features, yet the mechanisms behind their comorbidity are not well understood, and while each condition alone has extensive literature, there is limited evidence to support specific care and treatment for the two conditions simultaneously. In addition, there is currently no UK data for veterans with comorbid chronic pain and PTSD so it is not possible to gauge the numbers affected or to predict the numbers who will be affected in the future, and there appear to be no co-located services within the United Kingdom for the management of the two conditions simultaneously in this population.

Conclusion: This review highlights a paucity of evidence in all areas of comorbid chronic pain and PTSD. Further work needs to consider fully the nature of the event that led to the development of the two conditions and examine further the possible mechanisms involved, and clinics need to establish routine and systematic evaluations of how any interventions work in practice.

Keywords

Chronic pain, post-traumatic stress disorder, comorbid conditions, veterans, armed forces

Introduction

The association between chronic pain and post-traumatic stress disorder (PTSD) in civilian and military populations is well documented;^{1,2} however, the mechanisms behind this and the best courses of treatment are poorly understood. Chronic pain and PTSD occur together in veterans more frequently than either condition alone,^{3,4} and this comorbidity can have worse implications for well-being than either condition individually.^{5,6} Veterans with both conditions report greater psychological distress and functional interference compared with those with chronic pain but without PTSD, and those with chronic pain often report more severe PTSD.⁷ The aim of this article is

to summarise what is known about why chronic pain and PTSD frequently co-occur, what is known about treatment options, current service provision for UK veterans with both conditions and to provide research recommendations.

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Definitions

Pain is defined by the International Association for the Study of Pain as ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage’ (p. 210).⁸ Chronic pain is pain that lasts for longer than 3 months, persisting beyond healing of any initial injury or disease.⁸ As pain increases, so does emotional distress, functional limitations and increased use of healthcare services.⁹ The pain cycle is self-perpetuating and self-reinforcing, as painful sensations lead to activity avoidance, in turn leading to atrophied muscles and decreased flexibility, ultimately maintaining the pain cycle.

PTSD is a psychological condition that can develop after exposure to a traumatic event. The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5)¹⁰ includes four symptom clusters: re-experiencing, avoidance, negative alterations in cognition/mood and alterations in arousal and reactivity. The International Statistical Classification of Diseases and Related Health Problems¹¹ describes PTSD as containing three components: re-experiencing, avoidance and heightened sense of threat. People with PTSD commonly avoid trauma-related thoughts and emotions and discussion of the traumatic event; however, the event is relived through intrusive, recurrent recollections, dissociative episodes (flashbacks) and nightmares. While these feelings are common after any traumatic event, they must cause significant dysfunction or distress for longer than 1 month to be classified as PTSD.

Methods

The literature was sourced from PubMed and subject-specific websites, including the Department of Health, the Ministry of Defence and the United States Department of Veterans Affairs. Searches were carried out for work published up to December 2018 and included the search terms chronic pain and post-traumatic stress disorder/PTSD, comorbidity, veterans and UK veterans.

Results and discussion

Prevalence

Establishing the prevalence of chronic pain and PTSD individually and as comorbid conditions, and within the general and veteran populations, is challenging due to different populations studied and different assessment measures employed. A systematic review of chronic pain research in the UK general population¹² found prevalence from 35% to 51%. Prevalence of

moderate to severely disabling chronic pain ranged from 10% to 14%. We did not find any papers reporting prevalence of chronic pain among UK veterans; however, US research reports chronic pain prevalence in veterans of 44%.¹³ It should be noted that Toblin et al. estimate chronic pain prevalence in the general US population to be 26%, lower than that reported for the general UK population, leading Toblin et al. to conclude that chronic pain is more prevalent in (US) veterans than the general population. We cannot draw the same conclusions for UK veterans due to absence of data. The most recent Adult Psychiatric Morbidity Survey for England¹⁴ estimates a prevalence of 4.4% for PTSD in the general population. In UK veterans, Stevelink et al.¹⁵ report a prevalence of 5% for ex-service regulars who had not deployed and 9.4% for those who had deployed. For UK veterans whose last deployment was in a combat role, PTSD prevalence was 17% compared to 6% among veterans whose last deployment was in service support. We could not find any UK prevalence data for comorbid chronic pain and PTSD. US data reveal that across veteran and general population samples, 10–50% of those seeking treatment for chronic pain have a diagnosis of PTSD or significant PTSD symptoms, and 45–80% of those seeking treatment for PTSD have chronic pain.¹⁶ Prevalence of comorbid chronic pain and PTSD can therefore be high within clinical settings; however, the association is also apparent in the general population, with Beck and Clapp¹⁷ reporting modal prevalence of 7–8%.

Possible mechanisms of comorbid chronic pain and PTSD

Four psychological models have been proposed to explain comorbid chronic pain and PTSD.⁹ The shared vulnerability model proposes that anxiety is the underlying factor in both. People who are more anxious are more likely to become fearful in response to pain or a traumatic incident and avoid reminders of both, further fuelling both conditions. The mutual maintenance model suggests seven components drive and maintain pain and PTSD: anxiety sensitivity, pain as a reminder of the traumatic event, attentional bias, avoidance in order to cope, fatigue and lethargy driving depression, general fear associated with both conditions and overwhelming cognitive demands of both that limit the ability to learn or use coping techniques. The fear-avoidance model suggests avoidance develops and maintains both conditions. Fear and avoidance of reminders drive PTSD, preventing processing of the traumatic event and fuelling chronic pain so that individuals avoid activity and overestimate future pain from such activity. The triple vulnerability model states that an integrated set of vulnerabilities cause anxiety

disorders: a biological vulnerability, a psychological vulnerability based on early experiences and a further psychological vulnerability where anxiety is focussed on specific situations.

An additional theory suggests a possible memory pathway and the notion of pain flashbacks, a form of somatosensory memory where pain experienced at the time of a traumatic event is re-experienced when triggered later.¹⁸ Examples include a soldier who lost his eye and who re-experienced headaches that he reported felt like pain experienced during a long wait for surgery,¹⁹ two patients who regained consciousness during anaesthesia and who later re-experienced pain felt during their operations,²⁰ and a survivor of the 2005 London bombings who, when reminded of the trauma, reported re-experiencing pain in his arms he felt during the explosion.²¹ Macdonald et al.¹⁸ noted pain flashbacks in 49% of 166 patients diagnosed with PTSD that were associated with the extent of pain at the time of trauma, providing evidence that people with PTSD may experience pain through memory mechanisms and suggesting some cases of unexplained, refractory chronic pain may be pain flashbacks with origins in psychological trauma.

There has been little exploration of physical pathways. Scioli-Salter et al.²² suggest high comorbidity relates to reductions in baseline and/or stress-stimulated increases in peripheral and central nervous system levels of neuropeptide Y and GABAergic neuroactive steroids. Pain can trigger memories and re-experiencing trauma by activating the amygdala through the thalamus and parabrachial nucleus, affecting pain sensitivity by increasing molecular substrates in the dorsal horn of the spinal cord that facilitate transmission of pain from the periphery. For a review of (inconclusive) evidence for neurobehavioural mechanisms underlying comorbid chronic pain and PTSD, see Moeller-Bertram et al.²³

To date, no model has significant empirical support, and the reason for the association between chronic pain and PTSD remains unclear;²⁴ however, there does seem to be an association and the presence of each could influence the other. The two conditions share many factors, including anxiety sensitivity, catastrophic thinking, attentional biases, avoidant coping styles, hyperarousal and hypervigilance, fear and heightened somatic focus.¹ In addition, both conditions are cyclical. Chronic pain affects emotional functioning, often resulting in depression, anxiety, guilt, shame or anger and reduced ability to cope with pain, which may lead to the development of maladaptive or avoidant coping strategies. Relationships and occupational and social functioning may suffer and fear of pain may dictate and reduce physical activity. Similarly PTSD is associated with significant distress and impairments in social

and occupational functioning. Feelings associated with PTSD are interactive, where re-experiencing traumatic situations becomes associated with increased physiological arousal, resulting in avoidance of trauma reminders. Attempting to avoid these feelings may worsen the experience of the event, thus perpetuating the cycle. Living with both conditions is clearly debilitating, with sufferers reporting additional health problems with greater frequency, more pain-related disability, higher pain ratings and increased functional impairment.²⁵

Treatment of comorbid chronic pain and PTSD

While overlapping symptoms between the two conditions often paint a confusing picture, commonalities may be advantageous for treatment as they could respond to simultaneous intervention, thus interrupting a cycle where each condition exacerbates the other.¹⁶ This is in line with evidence-based chronic pain management guidelines – advocating multidisciplinary care, educational and behavioural approaches and integrated treatment of comorbid psychological conditions – and is consistent with a recent evaluation of UK services for PTSD,²⁶ which notes that its optimal management involves multidisciplinary professionals providing different types of support simultaneously. There are, however, few examples of simultaneous treatment of comorbid chronic pain and PTSD. Bosco et al.⁷ suggest that confronting feared stimuli, addressing fear-avoidance that features in both, may be the most effective approach and outline an interdisciplinary outpatient programme currently underway in the United States that focuses on improving functioning and quality of life by decreasing avoidance behaviours. The authors report promising short-term results but, as they state, this requires long-term follow-up, which is currently underway. Plagge et al.¹⁶ developed integrated treatment using behavioural activation therapy, which aims to increase rewarding experiences through engagement in activities. In addition, Resick et al.²⁷ recommend treatments emphasise cognitive restructuring to address negative ways of thinking that feature in both conditions. Gibson²⁸ outlines 10 recommendations for treatment; however, it is not yet clear how effective each of these are in the long term, and Scioli-Salter et al.²² suggest targeting shared biological pathways, although the exact nature of these requires further exploration. In summary, there is currently no evidence from large-scale, long-term studies from which to develop care guidelines to manage both conditions simultaneously.

Current service provision for UK veterans with chronic pain and PTSD

In the United States, veterans are treated in the Department of Veterans Affairs, a network of facilities with clinicians with knowledge of military service. In the United Kingdom, there are dedicated services for injured serving armed forces personnel but once they become veterans, they are treated within the National Health Service (NHS) by clinicians with variable military knowledge.

There has been some debate about whether veteran-specific health services should be established in the United Kingdom. A study of traumatised or injured British veterans identified a range of challenges veterans face when leaving the military, such as feeling estranged or disconnected from civilian society.²⁹ While veteran-specific health services and groups would provide social support from others with a similar background, they do not necessarily help veterans reintegrate into civilian life and adjust to life post military career. It is unclear whether this is best addressed by exposure to civilian life or by continued contact with ex-service personnel. 'Anecdotally . . . individuals and organisations more closely allied to serving personnel favour veterans-only provision. However, charities engaged in long-term support for veterans adapting to civilian life . . . emphasise the benefits of "mainstreaming"' (p. 83).³⁰

There are, however, a number of veteran-specific services and initiatives within the United Kingdom. The Veterans Trauma Network is a group of hospitals across England providing specialist surgical care to injured veterans by experts who understand veterans' health problems. Anecdotally, they report that chronic pain is one of the most common conditions they see in veterans using the service (personal communication via email between second author and Mr. Shehan Hettiaratchy, Clinical Lead, Veterans Trauma Network, 6th March 2019). For specialist mental health support, NHS England established the Veterans' Mental Health Transition, Intervention and Liaison Service (TILS). Veterans NHS Wales employs therapists trained in military-related mental health problems in each local health board and NHS Scotland provides information on local support services. The Veterans Covenant Hospital Alliance is a network of more than 20 NHS hospitals in England where patients should be asked routinely if they are a veteran and given information about appropriate services. The Armed Forces Covenant aims to ensure armed forces personnel, veterans and their families have the same access to government and commercial services as any other citizen and is fulfilled by the different groups that have signed the Covenant. The UK Government's new Veterans

Strategy for England, Scotland and Wales sets out principles to support veterans in all aspects of their lives. In healthcare, a key aim is to establish more collaborative and coordinated services for physical and mental health.

While there are a number of important initiatives, co-location of physical and mental health services in general, and specifically for comorbid chronic pain and PTSD in veterans, is not yet a reality. Current NHS provision for veterans involves accessing separate services for physical and mental health, and there appears to be no coordination of services for managing comorbid chronic pain and PTSD. Clinicians are challenged by overlapping symptoms and their interactions, making accurate diagnosis difficult, and it is essential they understand how each problem presents, potential interactions and effective treatments, none of which is clear. It is important at least to establish if the patient is a veteran and if they present with one condition, clinicians should look for the presence of the other.²⁴ An awareness of military culture is essential, so treatments can be individually tailored. US work to treat comorbid chronic pain and PTSD has involved modifying existing programmes for veterans,³¹ which does not appear to be common practice in the United Kingdom; however, most UK pain management programmes have multidisciplinary teams with relevant skills that can be adapted for this population once this demographic is understood better, namely existing expertise in treating comorbid chronic pain and mental health problems and understanding the wide-ranging impact this has on individuals' lives.³⁰ Gauntlett-Gilbert and Wilson³⁰ provide detailed recommendations for service planning and treatment, including necessary staff competencies and service design. They consider the customary staff mixture in UK pain management programmes of psychology, physiotherapy and occupational therapy to be appropriate for veterans, and emphasise the importance of competence in assessing PTSD and establishing the level of comorbidity that can be managed within local services. They also detail what appropriate 'cultural training' might involve, which includes an understanding of military trades and ranks, military rehabilitation facilities and treatment approaches, the military discharge process and service cultures around physical exercise.

Further research

More research is needed in all aspects of comorbid chronic pain and PTSD. The starting point for understanding the complex relationship between the two conditions should be with the traumatic event itself. Across all populations and all types of pain and PTSD, the common factor is the event that caused these

conditions.³² In a review of 40 studies of different types of pain and comorbid PTSD,²⁴ none looked at the traumatic event in detail. Data should therefore be collected on the type of event that led to the development of both conditions, necessary for determining temporal relationships, assigning causality and understanding the clinical evolution of the conditions. We need to establish if there is a chronological relationship between the traumatic event and any subsequent physical and mental health problems before we can refine explanatory models and develop beneficial interventions.³³ Currently none of this is well understood.

We also need to understand the nature of chronic pain. When discussed as comorbid with PTSD, chronic pain is mostly referred to as one condition, while it comprises different types of pain, with different origins and different subjective experiences. Fishbain et al.²⁴ recommend research sub-divides chronic pain into different types of pain as they have in their review. More work is needed to understand the nature and prevalence of pain flashbacks in veterans with chronic pain and factors associated with their occurrence, as evidence-based pain management may be ineffective in these cases and psychological treatments that work with other post-traumatic memory symptoms may be beneficial. Similarly, PTSD is not one phenomenon. While there are commonalities, known as 'symptoms' by diagnostic criteria, each person's lived experience will be different. We need to understand more about the content of veterans' nightmares and flashbacks, for example, to see if this holds clues to the comorbidity of chronic pain and PTSD.

There is currently no definitive UK data on any aspect of veterans' health. An important study currently underway in the United Kingdom that starts to address this is the ADVANCE study,³⁴ a 20-year research programme that aims to investigate the long-term medical and psychosocial outcomes of blast and other battlefield trauma in UK veterans of the Iraq and Afghanistan wars (2001–2014). It is not clear at this stage what work will be carried out with this population specifically around comorbid chronic pain and PTSD. Research into comorbid chronic pain and PTSD needs to look at differences by demographic variables, including age, sex and ethnicity, and other characteristics such as education³ and socioeconomic status³⁵ and consider pre-existing vulnerabilities such as previous trauma, the impact of which on both conditions is unknown, and associations with other medical and psychological problems, including alcohol and drug use.⁷ More research is needed with UK military populations, and should include such military-related information as branch of service and rank, length of service, deployment history and reason for discharge.³⁰ This may help identify at the acute stage those at

greatest risk of developing complex and persistent problems following combat, important for developing early clinical interventions, and a further area that research has not explored. Finally, research should develop evidence-based assessment and treatment approaches. More research is needed on care models, and services should conduct long-term follow-up studies with multiple outcomes, including clinical outcomes, patient satisfaction, social functioning and quality of life.²⁶ Chronic pain and PTSD services need to establish routine, continuous evaluations of how interventions work in practice.

Conclusion

It is challenging to understand the aetiology, nature, prevalence and impact of comorbid chronic pain and PTSD in UK veterans and resulting implications for treatment. The conditions appear to present together in veterans more frequently than either condition alone, but development and maintenance of the two is poorly understood and there is limited evidence for treatment of both conditions simultaneously. At the root of this is the traditional separation of physical and mental health services; veterans with comorbid chronic pain and PTSD attend separate pain management and PTSD services. Consequently, research has involved two separate approaches – studying chronic pain among people with PTSD, or PTSD among people with chronic pain – and no research has yet looked at this in UK military populations. Furthermore, there are different approaches to treating each condition alone but no systematic evaluation of treatments for both simultaneously. Research reveals variable and conflicting findings due to different study populations, assessment methods and diagnostic criteria for chronic pain and PTSD, which will presumably change further with new criteria for PTSD in *DSM-5* and *International Classification of Diseases, eleventh revision* (ICD-11), the impact of which is currently unknown. There is no UK data for veterans with comorbid chronic pain and PTSD, making it impossible to gauge current numbers affected and to predict the numbers who will be affected in the future, and it remains unknown what the long-term implications are of this for caring for veterans over the coming years.

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