

# Psychological aspects of chronic pain: a literature review

SP Walker

Department of Psychology, University of the Free State, Bloemfontein, South Africa

## ABSTRACT

The influence of psychological variables on the experience of chronic pain continues to be underestimated by many healthcare practitioners. This literature review attempts to highlight the applicability of the conceptualization of chronic pain within the biopsychosocial model and diathesis-stress framework. Within these paradigms the emotional disorders more frequently associated with the experience of chronic pain are explored. Attention is also paid to mechanisms underlying the development and maintenance of chronic pain-related emotional disorders. Finally, the implications of a more holistic conceptualization of chronic pain for clinical practice are investigated.

## Introduction

Pain is the most frequently cited reason for visits to general practitioners and for the use of auxiliary healthcare services.<sup>1</sup> It is estimated that in the United States of America alone near 70 million individuals experience some form of acute, recurrent or chronic pain each year.<sup>2</sup> In the absence of local national pain statistics, it can be hypothesized that pain-related complaints similarly constitute a significant volume of the South African physician's workload. Within the ambit of pain-related complaints, chronic pain is probably viewed as the most challenging condition for the physician to manage effectively. Chronic pain, due to its symptomatic nature, constantly confronts the sufferer with the reality of their condition and associated impairment. This is often in stark contrast to other chronic conditions such as hypertension or diabetes.<sup>3</sup> Moreover, many presentations of chronic pain lack a direct correlation between the extent of the structural pathology and the severity of the individual's subjective sensory experience and impairment. The aforementioned lack of pathological evidence or a perception of excessive reaction to limited tissue damage frequently results in physicians and patients differing in regard to their judgement of the authenticity of the patient's clinical presentation.<sup>4</sup>

These conflicting views often lead to frustration on the part of the physician and a temptation to ascribe the patient's difficulties to psychological dysfunction. Much of this frustration is rooted in the conceptualization that

medical science has long held of pain as a purely somatosensory phenomenon. This approach fails to consider the mediating effect that emotion, personality, psychopathological conditions and social influences may have on the individual's experience of pain. Consequently, the physician may often run the risk of disregarding the complex interrelationship between emotional and physiological variables that result in the experience of nociception as physical pain. An attempt will be made in this article to highlight psychosocial factors relevant to the experience of chronic pain. More specifically attention will be given to: the biopsychosocial framework as a conceptualization model for the experience of chronic pain; personality as predisposition to the experience of pain; anxiety, depression and their relationship to chronic pain; and the cognitive mechanisms by which the experience of chronic pain and associated emotions often become distorted.

## A biopsychosocial perspective on chronic pain

Medical science appears to have initially taken a predominantly mechanistic view of pain. In the seventeenth century for example, Descartes conceptualized pain as a "straight-through" channel from sensory receptors to the brain.<sup>5</sup> This implied that the intensity of the pain experienced by an individual could be directly deduced from the intensity of the noxious stimuli the nervous system was subjected to. Similar postulations with regard to pain appear to have remained largely unchallenged until the 1960's, when the Gate Control Theory of Pain hypothesized that since pain-perception and emotional experiences were both mediated by the central nervous system, it was plausible that emotional disturbances could impinge on the physiological experience of pain.<sup>6</sup> Although the Gate

## Correspondence:

SP Walker

email: walkersp.HUM@mail.uovs.ac.za

Control Theory was found to be limited, it did succeed in altering the way in which the pain perception process was conceptualized.

The notion that patients' experience of pain could be understood beyond a strictly dualistic formulation of being either purely psychogenic or exclusively physiological, stimulated conjecture regarding the effect of other variables on the individual's experience of pain-related conditions. Psychosocial variables were more frequently viewed as contributing to the pain experience of all patients, including those whose clinical presentations were largely in keeping with the severity of their organic pathology. Thus instead of psychological influences being viewed as the cause of exaggerated symptomology and attempts to malingering or make secondary gains, they became part and parcel of the accepted pain-related makeup of all patients.<sup>7-8</sup> In keeping with this mode of thought, Turk asserts that the experience of pain, particularly pain that persists over a long period of time, is comprised of a myriad of factors, all of which can contribute to the interpretation of somatosensory stimuli as pain.<sup>9</sup> Accordingly, he views the biopsychosocial conceptualization of the experience of pain to be based on the tenet that each individual's experience of pain is unique. This personalized experience is influenced by the individual's physiological constitution, their perceptions of social support, their expectation of treatment, psychological variables and the implications that their impairment has for their economic or occupational status.<sup>1,3,10-12</sup> These factors are perceived as playing an ever increasing role in the pain experience as the individual's condition progresses from acute to chronic.<sup>2</sup> Consequently, it has become common to view a patient with a chronic pain condition as a unique individual functioning within a complex context of physiological, psychological and social variables, all of which interact to modulate his/her subjective experience of pain.

The conceptualization of patients' chronic pain problems within the biopsychosocial model would appear to have significant implications for the manner in which pain management is approached. For instance, if it is accepted that pain is a highly individualized experience determined by the unique constitution and context of the sufferer, then this condition can best be understood by the individual in question. This implies that the healthcare provider needs to view the patient as the expert on his or her pain.<sup>8</sup> Consequently, treatment would have to take on a highly collaborative character, with the patient's inputs and insights being valued as critical contributions to the healing process. This approach initially met with resistance from more physiologically oriented quarters. However, it became apparent relatively early in the multidisciplinary study of pain that only a small amount of the total disability associated with lower back pain for example, could be attributed to physical impairment.<sup>13</sup> Thus a large proportion of the variance in the maintenance of various pain-related conditions cannot be explained in purely physiological terms. Attempts to effectively treat these

conditions consequently necessitate not only accessing the patient's particular reality of the pain experience, but also obtaining their confidence in the proposed treatment plan.

A more comprehensive conceptualization of an individual's experience of pain implies that in order for treatment to be effective, it needs to be propagated on multiple levels and via multiple modalities. This lends significant support to a multidisciplinary approach to the assessment and treatment of chronic pain. Multidisciplinary treatment programmes have consistently been proven to be the most effective and economic approach to the management of pain-related conditions and to chronic pain in particular.<sup>14-16</sup> However, the effective interdisciplinary treatment of pain-related disorders requires an in depth understanding of the complex interaction between the physiological and psychosocial factors involved in the development and maintenance of these conditions. Within the context of the biopsychosocial model, a diathesis-stress framework has been proposed as a template for the dynamic interaction of physiological and psychosocial influences in the development and maintenance of chronic pain.<sup>1</sup>

In terms of the diathesis-stress framework, individuals are viewed as having certain inherent vulnerabilities (diatheses) to develop certain disorders or difficulties when exposed to particular environmental influences or stressors.<sup>17</sup> When chronic pain is viewed within the context of the diathesis-stress framework, a dynamic, bidirectional interaction between physical perceptions and psychosocial variables becomes apparent.<sup>1,9,18</sup> A patient may experience an acute pain reaction to a lower back injury for example. This patient's specific propensity for developing some emotional difficulty (e.g. anxiety) could cause her to frequently misinterpret noxious stimuli associated with her injury as a near mortal threat to her wellbeing. She subsequently becomes more concerned with her lower back, which simultaneously begins to spasm more frequently due to the physiological sequel of her increased level of anxiety. The patient's injury thus takes longer to heal than was initially expected, which in turn causes an escalation in her level of anxiety. As her condition progresses from acute to chronic, the patient becomes more sedentary, fearing that physical exertion may exacerbate her condition. This in turn leads to a loss of muscle tone and increased risk of further injury, which are again interpreted within the context of her elevated anxiety, and thus her lower back pain develops into a chronic condition.

The preceding example should illustrate the reciprocal and cyclic nature of the diathesis-stress relationship, as it relates to chronic illness. An effective treatment approach to chronic pain would thus have to consider the presence of pre-existing vulnerabilities, as well as the development of emotional distress as a result of prolonged pain, immobility and the financial loss or occupational impairment that frequently accompanies disability. Moreover, the efficacy of a treatment plan would rest largely on its ability to target the area of

greatest clinical impact. The implication is that the area of most significant clinical impact may frequently not be physiological, but emotional or social. The danger of erroneously labelling a troublesome chronic pain patient as a "head case" or somatizer should be apparent. Even if this diagnosis or classification appears to be justified, it does not constructively alter the patient's reality of their pain. To the contrary, such a diagnosis may lead to adoption of the sick role, increased inactivity or elevated levels of emotional discomfort, and thus feed a cycle of maintenance rather than contribute to the alleviation of the person's condition.<sup>1,12</sup> Thus the minimum requirement for the effective assessment and treatment of individuals suffering from chronic pain is a basic knowledge of the psychosocial factors that may colour the patient's presentation and influence their progress in treatment. The particular scope of this article only allows for a brief review of the more common psychological factors associated with chronic pain.

### Psychological factors and chronic pain

Various psychological factors have been associated with the experience of chronic pain.<sup>1</sup> Congruous to the diathesis-stress conceptualization of chronic pain, these factors function either as predisposing factors in the development of chronic pain symptoms or develop in reaction to physical injury and impairment to contribute to the maintenance of a pain state.<sup>3,12,18-19</sup> A review of the chronic pain literature reveals that specific areas of psychological functioning have received particular attention in attempts to tease out a relationship between intrapersonal phenomena and the experience of chronic pain. Personality has received attention, specifically regarding attempts to identify predisposing traits, as well as the ramifications of personality disorders for the experience of pain-related conditions.<sup>20-25</sup> The relationship between emotional disorders and chronic pain has also been extensively investigated. The literature tends to highlight depression and anxiety in this regard.<sup>3,26</sup> While depression has long been associated with chronic illness, more recent studies have begun to uncover the contribution that specific anxiety disorders make to the development and maintenance of certain forms of chronic pain.<sup>26-28</sup> The ensuing discussion will thus focus on the influence that personality, depression and anxiety have on chronic pain. In addition, cognitive distortions more frequently implicated in the prolongation of pain-related emotional disorders will be explored.

### Personality

Psychiatry and psychology have long endeavoured to identify innate characteristics which predispose individuals to manifest pathology in some or other form. Theories surrounding chronic pain have tended to be heavily influenced by early psychoanalytic ideas regarding the somatization of internal emotional turmoil. Weisberg and Keefe elucidate the psychoanalytic conceptualization of chronic pain as being based on the premise that persistent pain experienced in excess of

what would usually be associated with a given physical pathology, has its basis in deep-rooted unresolved personality conflicts.<sup>18</sup> These ideas, while held in ever decreasing regard, have informed a school of psychological thinking pertaining to the interrelationship between personality, psychological wellbeing and physical symptomatology.

Increased interest in the dynamics underlying chronic disease states prompted a progression from the conjecture of the psychoanalytic school to more empirical investigations of the relationship between personality and chronic pain. These studies spawned two main avenues of thought. The first held that long-standing personality dispositions influenced the individual's experience of physical pathology. These trait theories suggested that personality traits largely contributed to how individuals respond to the onset, persistence and treatment of pain.<sup>29</sup> The second school of thought modified these ideas slightly to where authors like Blummer and Heilbronn argued that certain individuals are placed at increased risk of developing chronic pain by virtue of their personality composition.<sup>20</sup> The role of personality had thus evolved from a predetermined one to that of inherent risk-factor. The next advancement in personality-pain theories accompanied the popularization of the biopsychosocial approach to understanding chronic pain. According to Weisberg and Keefe, biopsychosocial approaches hypothesize that personality interacts with biological factors and thus modulates the manner in which an individual responds to pain.<sup>18</sup>

The more personality-driven approaches to understanding chronic pain have proved difficult to support empirically. Following Blumer and Heilbronn's thesis of a pain-prone personality, noteworthy volumes of research were generated in an attempt to identify pain specific personality profiles.<sup>20</sup> Regrettably, consistent empirical support for such profiles was not forthcoming. Chronic pain patients do not appear to fit into absolute categories based on their personality structure and dynamics.<sup>18</sup> Moreover, heavy criticism was levelled against the relevance of using general clinical measures such as the Minnesota Multiphasic Personality Inventory (MMPI) and the Millon Clinical Multiaxial Inventory (MCMI) in pain assessments.<sup>30-31</sup> It was reasoned that, by their very nature as pathology-detecting instruments, these measures were inclined to cast a pathological shadow over characteristics associated with the experience of chronic pain. Sensitivity was also a problem. Specifically, concerns existed that individuals with personality structures that may influence the experience of pain, but were not by definition pathological would go undetected by general clinical measuring instruments. Additionally, the wisdom of using clinical pain patients as subjects in these studies could be questioned. It is noted that the effect that years of living with chronic pain may have on personality structure and personality dynamics has often not been adequately controlled for in personality profile studies.<sup>18,31</sup> However, despite the criticism levelled against attempts to define pain-prone personality

profiles, research into the interaction between pain and personality has contributed to contemporary thinking on pain. The consideration of personality dynamics on a case-by-case basis has important implications for the effective tailoring of pain management interventions to meet the needs of individual patients, thus enhancing their effectiveness. Moreover, pronounced personality dysfunction as occurs in personality disorders has been proved to be a predictor of increased disability, treatment complication and poor treatment outcome in chronic pain.<sup>32</sup>

#### **Emotional distress associated with chronic pain**

Emotional tumult has been strongly associated with the experience of chronic pain. The strength of this association is reflected in the International Association for the Study of Pain's interpretation of pain as a multidimensional construct comprising both sensory and emotional components.<sup>33</sup> Furthermore, it is widely accepted that individuals who suffer from chronic pain also experience a wide range of affect associated with their afflictions.<sup>1</sup> McWilliams, Goodwin and Cox add that depression is, by far, the most thoroughly researched affective component of chronic pain.<sup>26</sup> There appears to be some controversy in the literature regarding the prevalence of depression among chronic pain patients. However, the consensus seems to be that, as a group, patients with chronic diseases experience higher incidents of depression than are found among the general population. In turn, depression appears to be more common among chronic pain patients than among individuals suffering from other medical conditions.<sup>3,34</sup>

Despite apparent consensus on the increased prevalence of depression amongst chronic pain patients, little agreement has been reached regarding the nature of the relationship between these phenomena. Banks and Kerns assert that there is much debate over the temporal relationship between depression and chronic pain, and even more disagreement regarding the possibility of a causal association between the two.<sup>3</sup> Nonetheless, they do highlight three hypotheses that have been proposed with regard to the interrelation between depression and pain. The first hypothesis suggests that depression precedes the development of chronic pain. The general premise is that pre-existing depression increases sensitivity to pain and may also be implicated in reducing pain tolerance.<sup>35-36</sup> The second hypothesis proposes that depression and chronic pain share a common biological or physiological root and thus occur simultaneously. The final hypothesis highlighted by Banks and Kerns, is based on the notion that depression is a psychological reaction to chronic pain. Furthermore, various authors speculate that given that chronic pain contributes to the development of depression, cognitive and behavioural factors which are known to modulate the development of emotional disorders in the absence of pain should also primarily modulate the development of depression associated with chronic pain.<sup>37-39</sup> This assumption has stimulated the development of various cognitive-behavioural approaches to the treatment of

emotional disturbances associated with chronic pain.<sup>40</sup>

Strong emphasis on the contribution of depression to chronic pain has resulted in a dearth of research into the role played by other common emotional disturbances such as anxiety. However, more recently the interaction between anxiety and chronic pain appears to have received increased attention from researchers.<sup>27-28,41</sup> In a study conducted by McWilliams, Goodwin and Cox diagnoses of Generalized Anxiety Disorder and panic attacks were as strongly associated with migraine and multiple pain conditions as a diagnosis of depression was.<sup>26</sup> Interestingly, diagnoses of Generalized Anxiety Disorder appeared to be more strongly associated with arthritis than depression was, while panic attacks were more strongly associated with back pain. Consequently, it seems that anxiety disorders accompany chronic pain conditions as frequently as depression does, and may even be more frequently associated with certain conditions.

Regardless of the aforementioned finding, expositions of the interrelationship between anxiety and chronic pain appear scarce. However, one particular anxiety-related phenomenon warrants further discussion. Anxiety sensitivity is the tendency certain individuals exhibit to fear common symptoms of anxiety due to the misapprehension that these symptoms hold harmful consequences for the person. Asmundson and Norton reported that patients with high levels of anxiety sensitivity were more inclined to report pain-related cognitive anxiety and fear of pain, as well as be more inclined to engage in avoidance behaviour, than patients with moderate and low levels of anxiety sensitivity.<sup>42</sup> Anxiety sensitivity may thus amplify an individual's experience of pain by contributing to the misinterpretation of purely anxiety-related parasympathetic nervous system activity as pain or disease related phenomena. Moreover, physical manifestations of chronic anxiety, such as muscle tension, may aggravate existing pain conditions like chronic low back pain.

#### **Mechanisms of emotional distress in chronic pain**

Having noted that in many cases a relationship exists between chronic pain and emotional distress, specifically depression and anxiety; it would be sagacious to consider the proposed nature of this relationship in more detail. Various perceptual and cognitive processes have been implicated as modulators in the interaction between chronic pain and emotional distress. More noteworthy examples include somatization, catastrophizing, fear-avoidance and self-efficacy. Each of these elements lends a specific character to the manifestation of pain-related emotional distress. Moreover, few patients' emotional aberrations are due to the exclusive influence of one of these factors. Nonetheless, in the interests of clarity, each will be discussed separately.

Robinson and Riley define somatization as "the predisposition to amplify physiological sensations or the misclassification of symptoms of emotional arousal".<sup>19</sup> It



is suggested that individuals suffering from chronic pain experience a heightened degree of physiological awareness. Consequently, they are more inclined to experience emotional turmoil in physical or pain-related terms. In conditions such as chronic pain where pain is accompanied by emotional distress, these individuals tend to focus on the physical component of the experience to the exclusion of accompanying cognitions and emotions.<sup>43</sup> Patients who tend to mislabel emotional distress as physical pathology could thus be reasoned to be more inclined to react to adverse life events and social stressors with increased reports of pain.

Catastrophizing continues to receive much attention with regard to the relationship between negative cognition and the experience of chronic pain.<sup>44-48</sup> Pain-related catastrophizing is defined by Peters, Vlaeyen and Weber as "an exaggerated negative appraisal of pain and its meaning".<sup>49</sup> Certain patients with chronic pain may thus demonstrate a proclivity for relating a catastrophic picture of their present situation and future to their experience of pain. These individuals may overestimate the debilitating effect that pain has on their functioning and thus be more inclined to become inactive or perceive themselves as disabled. Perceptions of support from significant others may also be skewed by a catastrophic mindset. Moreover, misperceptions of both the extent of their current loss and prospective incapacity often exacerbate the depression suffered by catastrophizing patients.<sup>44</sup> This deepened depression, in turn, leads to increased cognitive rumination fuelled by the patient's misinterpretation of the severity of their pain, thus feeding into a cycle of ever increasing depression, more frequent depression-associated experiences of physical stimuli and reinforcement of catastrophic interpretations of both the individual's current pain experience and anticipated suffering.<sup>40,50</sup>

The inaccurate amplification of expected negative pain experiences caused by catastrophizing also has implications for the development and maintenance of pain-related anxiety states. Anxiety has long been conceptualized, from a cognitive perspective, as being based on an exaggeration of the expected negative future consequences of an event or condition.<sup>50</sup> Consequently, catastrophizing about a chronic condition facilitates the generation of distorted anxiety-provoking cognitions and images regarding the future course of the condition. Accordingly, patients who are inclined to catastrophize about their pain would also be expected to report higher rates of pain-related anxious affect than non-catastrophizers.

Fear avoidance beliefs have gained increased empirical support as mediators of disability in chronic pain and are considered to be related to catastrophizing.<sup>51-52</sup> Patients who are inclined to catastrophize could also more readily be expected to appraise activities or situations as dangerous. The magnitude of the perceived danger directly relates to the individual's expectation that their pain will be intensified or prolonged by involvement in an activity (physical exercise), or exposure to a situation. Catastrophizers are

thus more inclined perceive certain activities or situations as sources of potential injury, and consequently are more inclined to avoid these activities and situations.<sup>41,53</sup> This generally leads to increased inactivity and the avoidance of physical exercise in particular. The avoidance of physical exercise rather than reducing pain may actually exacerbate physical pathology in certain patient groups such as those individuals with low back pain. Paradoxically the patient experiences a worsening of their condition despite avoiding activities which they judge to be potentially harmful. This often results in increased anxiety and avoidance, or may be interpreted as proof that catastrophic appraisals of future incapacity are correct, thus promoting a cycle of escalating anxiety and increased physical inactivity or perceived disability.

Coping strategies and internal fortitude have been highlighted from a diathesis-stress perspective in an attempt to explain variance with regard to the developmental path of numerous chronic pain conditions. Patient self-efficacy is regarded as a mediator of disability related to chronic pain and of treatment success.<sup>45,54-56</sup> Self-efficacy relates to an individual's belief that they will be successful in their attempts to perform a particular behaviour or reach a certain goal.<sup>57</sup> It would appear that the higher a patient's level of self-efficacy, the more inclined they are to engage in behaviours that promote recovery or the reduce discomfort, and the less susceptible they seem to be to the influence of cognitions associated with emotional distress.<sup>58</sup> These patients are also more likely to adhere to prescribed treatment regimes and seem more prepared to tolerate transient discomfort in order to facilitate long-term benefits. Patients who display higher levels of self-efficacy thus appear to have better prognoses than individuals who do not believe as strongly in their ability to maintain an adequate level of physical and occupational functioning despite their pain.

It may seem irregular that a review of factors influencing the experience of chronic pain conducted within the biopsychosocial framework does not address the effect of social variables such as culture, alienation and social support. Discussion of these factors was excluded primarily in the interests of brevity. The interrelationship of social variables to the experience of chronic pain is intricate, and would thus require extensive exploration in order to gain adequate insight into the relevant issues. However, numerous sources provide useful commentaries in this regard.<sup>59-61</sup>

### Summary and implications for practice

This article has attempted to highlight the complex nature of chronic pain, as well as the idiosyncratic nature of individuals' experience of chronic pain and related disability. More particularly, the need to conceptualize pain within a framework that adequately addresses its multi-faceted nature has been emphasized. The biopsychosocial model currently appears to be best suited to this task. It enables a formulation of an individual patient's pain experience in which the

importance of physical, psychological, social, environmental and economic factors is taken into account. Moreover, the dynamic interaction between all these elements is considered to make a vital contribution to the individual's experience of chronic pain. The use of the biopsychosocial model as a meta-theory necessitated the discussion of the most prominent psychological factors found to influence the course of chronic pain. Consequently, the role of personality variables, anxiety states and mood disorders were reviewed. The interaction between the aforementioned intrapersonal variables, the physical experience of noxious stimuli and environmental influences was addressed within the context of the diathesis-stress framework.

The conceptualization of chronic pain in terms of the biopsychosocial model and diathesis-stress paradigm has specific implications for the clinical management of chronic pain. Most importantly, this approach reiterates the multi-dimensional character of chronic pain. The implication is that strictly medical treatment of chronic pain conditions does not constitute optimal treatment. It should be apparent from the preceding review that any attempt to treat chronic pain while ignoring the contribution of psychological variables falls far short of being in the best interests of the patient. Consequently, a multidisciplinary approach must be adopted in the treatment of chronic pain conditions. Specific provision should be made within such multidisciplinary approaches for the implementation of cognitive-behavioural pain management programmes, as this treatment modality has been empirically proven to reduce the frequency and intensity of pain-related negative affect, while increasing the frequency of recovery promoting behaviours. This approach would translate not only into more accurate assessment of the patient's condition, but also enhance the success of chronic pain treatment and increase the durability of interventions.

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