Depression, Anxiety and Positive Outlook amongst patients presenting to an osteopathic training clinic: A prospective survey

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A research project submitted in partial fulfilment of the requirements for the degree of Master of Osteopathy, Unitec Institute of Technology, 2010
Declaration

Name of candidate: Richard John Clarke

This Research Project titled “Depression, Anxiety and Positive Outlook amongst patients presenting to an osteopathic training clinic: A prospective survey” is submitted in partial fulfilment for the requirements for the Unitec degree of Master of Osteopathy.

CANDIDATE’S DECLARATION

I confirm that:

- This research project represents my own work.
- The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.
- Research for this work has been conducted in accordance with the Unitec research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

Research Ethics Committee Approval Number: 2009.977

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Introduction

The prevalence and cost of chronic pain is of major concern to the health care system. The exact factors involved in the transition from acute pain into chronic pain are largely unknown, but psychosocial factors have been implicated in this process. Over the past 30-years theories and definitions of pain have moved away from purely nociceptive stimuli to also including affective and cognitive components. A number of psychological factors have been implicated as risk factors for the development of future pain problems and have been shown to be predictors of the persistence of pain. Depression and anxiety are two psychological factors that have received considerable attention in the pain literature. In addition, the presences of positive psychological factors have been implicated in improved outcome of pain problems. It is now widely considered that it is important to take into consideration the psychological state of an individual when developing a management plan for pain problems.

Osteopathy is an integrated approach to healthcare in which the individual person is seen as comprising multiple interacting components, which include the individual’s psychological well-being. While people presenting at osteopathic clinics generally present with pain, in order for effective assessment and management an osteopath needs to consider the patient’s physical and psychological well-being. Presently there is limited data on the prevalence of psychological factors in people presenting to osteopathic clinics and no data on the prevalence of psychological factors in osteopathic training clinics or osteopathic clinics in New Zealand.

This thesis presents a prospective survey that investigated the scores of a psychological screening tool called the Depression Anxiety and Positive Outlook Scale (DAPOS) (Pincus, Williams, Vogel, & Field, 2004) in an osteopathic training clinic. The DAPOS was designed for measuring depression, anxiety and positive outlook in pain populations. It was developed in 2004 and is therefore a relatively new tool and it has not undergone some of the extensive validation like that of older tools such as the Hospital Anxiety Depression Scale (Bjelland, Dahl, Haug, & Neckelmann, 2002) on which the DAPOS was based. However, a decision was made to
use the DAPOS because it has been previously used in an osteopathic clinic, thereby providing comparative data in the osteopathic setting. Also, it employs a measure of positive psychological factors and is quick and easy to administer. The DAPOS has been shown to be a reliable measure of depression and anxiety, but its measurement of positive psychological factors has yet to be fully validated, so this study employed another measure of positive affect to act as a comparison to the Positive Outlook subscale of the DAPOS.

The following Literature Review commences with a review of psychological factors in the context of the biopsychosocial model of illness, and how these factors fit into current models of pain and in particular chronic pain. Interactions between psychological factors and pain are reviewed; of particular interest are the effects that psychological factors have on pain. Depression and anxiety are identified as psychological risk factors for the development of pain and prognostic factors in the persistence of pain and their particular roles in pain are discussed. The role that positive psychological factors have in relation to pain is reviewed. The measurement of depression, anxiety and positive and negative mood in populations experiencing pain is then reviewed. The review concludes by looking at how psychological factors may be identified, assessed and managed within osteopathy.
Section 1: Literature Review
The biopsychosocial model of pain

The understanding of the nature of persistent pain has moved away from looking at isolated biological mechanisms to become a multifaceted model, which also considers psychological and social factors (Weiner, 2008). This biopsychosocial model for viewing illness was first theorised within psychiatry by Engel (1977); in its application to pain, the model considers a dynamic and reciprocal interaction between biological, psychological and social variables that shape a person’s response to pain (Turk & Okifuji, 2002). However, research in relation to pain has focused more on the psychological and biological interactions than the interaction between psychological and social components (Blyth, Macfarlane, & Nicholas, 2007).

Pain is defined by the International Association for the Study of Pain (IASP) as: “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage” (Merskey & Bogduk, 1994, p. 210). This definition reflects the multifaceted and subjective nature of pain and highlights that the experience of pain does not solely rest on physical determinants. Pain is a subjective experience that is the outcome of the transduction, transmission, and modulation of sensory information (Gatchel, Peng, Peters, Fuchs, & Turk, 2007). Pain should be distinguished from nociception, the later involves the stimulation of nerves that transports information to the brain about potential tissue damage even in the absence of any subjective reporting (Gatchel, et al., 2007).

The biopsychosocial model presumes there are physical changes that generate a nociceptive input to the brain (Turk & Okifuji, 2002). Signals can be modulated through gene expression leading to an alteration in the sensitivity to the pain (Gatchel, et al., 2007). Psychological factors are emotional, behavioural and cognitive characteristics that alter the experience of pain and responses to pain (McGrath, 1994). There is growing evidence that a person’s social environment can influence the experience of pain and that pain can influence a person’s social environment (Keefe, Rumble, Scipio, Giordano, & Perri, 2004).

The biopsychosocial model has been influential in the development of cognitive behavioural management of chronic pain (Turk & Okifuji, 2002). A systematic review of randomised controlled trials of cognitive behaviour therapy in chronic pain adults, found that cognitive behavioural treatments produced greater changes in pain experience, pain coping,
and pain behaviour than physical treatment alone (Morley, Eccleston, & Williams, 1999). A Cochrane systematic review of multidisciplinary rehabilitation for chronic low back pain, found that an intensive multidisciplinary biopsychosocial rehabilitation showed greater improvement in pain and function compared with less intensive multidisciplinary or non-multidisciplinary rehabilitation or usual care (Guzmán, et al., 2001). The criteria used by Guzmán, et al. (2001) for multidisciplinary biopsychosocial rehabilitation was treatment of the physical dimension and one of the other dimensions (psychological or social or occupational).

The extent to which each of the biological, psychological and social factors contributes to pain is still an area of research, yet the model has already received wide acceptance and implementation. The World Health Organisation uses the biopsychosocial model to form the basis of the International Classification of Functioning, Disability, and Health (Weiner, 2008). As early as 1997 the New Zealand government published guidelines in the Guide to Assessing Psychosocial Yellow Flags in Acute Low Back Pain: Risk Factors for Long-Term Disability and Work Loss, that outline the means for assessing the psychosocial factors which contribute to disability and may lead to chronic pain in people living with low back pain (Kendall, Linton, & Main, 1997). Furthermore, the New Zealand government has also published guidelines that advocate a multimodal biopsychosocial approach to the management of persistent pain (Accident Compensation Corporation, 2007).

**Definitions of chronic pain and persistent pain**

Chronic pain is a condition in which the attention-drawing nature of acute pain has persisted beyond what is a useful indicator of injury and can be experienced despite tissue repair. It has been estimated that chronic pain affects 10%-20% of adults in the general population and accumulates $70 billion annually in the United States in health care costs and lost productivity (Gatchel, et al., 2007).

The IASP defines chronic pain as “pain which persists past the normal time of healing” with 3-months being the most convenient point of division between acute and chronic pain (Merskey & Bogduk, 1994, p. xi). This is a definition that is being increasingly used in studies (Cousins, 2007), and was used by a systematic review on the prevalence of chronic pain to be in
agreement with the time frame of 3-months defined by the IASP and the American College of Rheumatology (Ospina & Harstall, 2002). A term that is used interchangeably with chronic pain is persistent pain. Although varying durations may be attributed to persistent and chronic pain, their definitions are not considered different (Cousins, 2007; Manchikanti, et al., 2001). Cousins (2007) argues that chronic pain or persistent pain is a disease entity, in that it is a disorder with a specific cause and recognisable signs and symptoms that become independent from the initiating disease process.

**Interaction between psychological factors and pain**

It is important to note the difference between psychogenic pain, which is psychological in origin, and psychological factors which are secondary to pain and its persistence. For complaints such as back pain there is no evidence that psychological factors cause back pain, nor is there any credible biological mechanism to explain psychological factors being the cause. However, there is evidence for, and plausible explanation behind, psychological disturbances being secondary to pain and its persistence (Bogduk, 2006). Theoretical models such as the gate control theory and the neuromatrix theory of pain recognise that affective and cognitive components are integral to the experience of pain (Wall, McMahon, & Koltzenburg, 2006). Pain also has an influence on our psychological wellbeing, yet this reciprocal nature of pain and psychological variables is not well understood and sometimes taken as unidirectional, with depression being seen as affecting pain, rather than pain affecting depression (Linton, 2000).

**Psychological risk factors and prognostic factors in persistent back and neck pain**

Bogduk (2006) classifies psychosocial factors associated with low back pain into two categories: i) those that are present before the onset of pain; and ii) those that may develop after the onset of pain. Factors that are present before the onset of pain are risk factors which are associated with a higher chance of developing pain in the future. Factors that develop after the onset of pain are prognostic factors which are associated with a higher risk of persistence of pain (Bogduk, 2006). A particular psychological risk factor is not necessarily a prognostic factor
as well and vice versa. For example, a review of psychological risk factors in back and neck pain found that fear-avoidance beliefs were important factors in the development of pain problems (Linton, 2000). However, a systematic review investigating the prognostic role that fear-avoidance plays in those presenting with acute low back pain found little evidence that fear-avoidance played a role in poor outcome (Pincus, Vogel, Burton, Santos, & Field, 2006).

Bogduk (2006) states that psychosocial variables have been shown to have more impact than any biomedical or biomechanical factors as risk factors for developing back pain. A systematic review that investigated psychological risk factors for the onset of back or neck pain found evidence for the involvement of psychological factors in the development of pain problems (Linton, 2000). Two large population based surveys since Linton’s (2000) review have found psychological distress and depression to be risk factors associated with the onset of spinal pain (Carroll, Cassidy, & Côté, 2004; Croft, et al., 2001). A recent systematic review of the determinants of neck pain in workers found that there is preliminary evidence that workers with depressive symptoms have a higher risk of developing neck pain (Côté, et al., 2009).

It is of great value to health care systems to be able to predict which acute patients are more likely to develop persistent pain, as this may provide guidelines for treatment. Bogduk and McGuirk (2002) state that psychosocial factors could account for about 30% of the variance between people whose acute back pain develops into chronic back pain and those in whom it does not. The factors that account for the remainder of variance are unknown and are not found within biomedical factors (Bogduk & McGuirk, 2002). Presently, no single factor or cluster of psychosocial factors has been shown to reliably predict those whose pain will become persistent (Bogduk, 2006). It is unlikely that a single psychosocial factor will be shown to predict persistent pain, yet promise has been shown for the important role that a cluster of factors have in predicting persistent pain (Thomas, et al., 1999). A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain, has suggested that the psychological factors which are important predictors for persistent low back pain are distress (the definition of distress incorporated psychological distress, depressive symptoms, and depressive mood) and somatisation (Pincus, Burton, Vogel, & Field, 2002). These findings on prognostic factors should be understood in the context that further
research into the transition from early stage low back pain to persistent problems is still needed; a consensus statement has outlined the need for methodological rigour in the studying of prognostic factors (Pincus, Santos, Breen, Burton, & Underwood, 2008). Furthermore, a recent study that investigated psychological obstacles to recovery in low back patients in primary care identified cognitive factors related to self regulation and self efficacy as better predictors of disability at 6-months than fear avoidance, catastrophising or depression (Foster, Thomas, Bishop, Dunn, & Main, 2010). Although, in this study fear avoidance, catastrophising and depression were still related to pain disability at 6-months when analysed separately (Foster, et al., 2010).

While most of the literature in this area has focused on the role of psychological factors in back and neck pain, psychological factors have also been implicated in other musculoskeletal pain disorders (Mallen, Peat, Thomas, Dunn, & Croft, 2007). Depression and anxiety have been included in a prediction rule for greater sick leave in patients with shoulder pain (Kuijpers, et al., 2006). Furthermore, a review of studies on people with temporomandibular joint disorder (TMJD) has reinforced the need to screen for affective disturbances (depression and/or anxiety) as an effective approach in the assessment and management of TMJD (Suvinen, Reade, Kemppainen, Könönen, & Dworkin, 2005).

**Depression: Definition, prevalence and measuring tools**

Depression is used to describe the lowering of mood, reduction of energy, and decrease in activity, which can be episodic or recurrent with varying degrees of severity (World Health Organization, 1992). Depression is defined according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) as having somatic, affective and cognitive components (American Psychiatric Association, 1994). For this reason it has been recognised that it is important for researchers measuring depression in pain populations to be able to measure depression independently of somatic complaints (Pincus, et al., 2004).

A New Zealand study of patients presenting to general practitioners found that 18% had a depressive disorder according to the definition used by the DSM-IV as determined by the World Health Organisation’s Composite International Diagnostic Interview (CIDI) (Mental Health
and General Practice Investigation Research Group, 2003). However, Mulder (2003) argues that the CIDI leads to an overestimation of diagnosis due to the formulaic diagnostic practices of the instrument and the emphasis on clinical symptoms by trained interviewers.

Measures for depression often incorporate questions on somatic items related to depression. In order to screen for depression in people experiencing pain without bias from those experiencing purely somatic problems, measures like the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983), the Depression Anxiety Stress Scale (DASS) (Lovibond & Lovibond, 1995), and the Depression, Anxiety and Positive Outlook Scale (DAPOS) (Pincus, et al., 2004) have been developed.

Anxiety: Prevalence and relation to pain

Anxiety disorders are disorders where anxiety is the major symptom and the anxiety is not restricted to any particular situation (World Health Organization, 1992). Anxiety can also manifest in patients with various somatic disorders (pain, dyspnea and chronic illness) (Balon, 2007). In the primary health setting in New Zealand, the prevalence of self-reported anxiety using the definition provided by DSM-IV was found to be 21% in a study on patients presenting to general practitioners (Mental Health and General Practice Investigation Research Group, 2003). Research into the relationships between anxiety and pain include factors such as fear of pain, anxiety sensitivity and hypochondriasis (Pincus, Rusu, & Santos, 2008). Anxiety, as both a state and a trait, has been associated with increased pain reporting (James & Hardardottir, 2002; Michelotti, Farella, Tedesco, Cimino, & Martina, 2000; Tang & Gibson, 2005). A clear empirical basis for anxiety increasing pain is not available, yet pain and anxiety may contribute to each other to create a deteriorative cycle (Wall, et al., 2006).

Normative data for self reporting measures of depression and anxiety in non-clinical and clinical populations

Normative data can provide descriptive accuracy (Busch & Chapin, 2008), and can provide a complementary approach to the use of cut-off points by providing information on the degree of rarity of a given score on a particular measuring tool (J.R. Crawford, Henry, Crombie,
A large well conducted study was administered on a non-clinical general adult sample (n=1792) to investigate normative data for the HADS (J.R. Crawford, et al., 2001). This study found that for the Depression scale, the percentages of the total sample that represented mild, moderate or severe using Snaith and Zigmond’s (as cited in J.R. Crawford, et al., 2001) cut-off scores were 7.8, 2.9 and 0.7% respectively. The corresponding percentages for the Anxiety scale were 20.6, 10.0 and 2.6%.

A study to establish normative data for the DASS in a non-clinical sample collected data from 1771 members of the general adult population (J. R. Crawford & Henry, 2003). This study found that for the Depression scale, the percentages of the total sample that represent normal, mild, moderate, severe and extremely severe using Lovibond and Lovibond’s (1995) cut-off scores were 81.7, 6.2, 6.3, 2.9 and 2.9% respectively. The corresponding percentages for the Anxiety scale were 94.4, 2.0, 3.8, 2.0, and 3.2%.

The DASS measures depression, anxiety and stress in adult populations using 3 subscales that range from 0-42, with higher scores indicating higher severity (Lovibond & Lovibond, 1995). A study that investigated normative data for the DASS on people with chronic pain presenting for treatment at pain clinics, reported means scores of 14.3 (SD=11.7, n=2445) and 9.3 (SD=8.7, n=2421) for depression and anxiety respectively (Nicholas, Asghari, & Blyth, 2008). The scores for depression and anxiety were lower when compared with the non-clinical sample in the study by J. R. Crawford and Henry (2003), where scores for depression and anxiety were 5.6 (SD=7.48, n=1771) and 3.6 (SD=5.39, n=1771) respectively.

**The role of anxiety and depression in chronic pain**

Depression and anxiety have been described as “worthwhile factors” to focus on in research relating to chronic pain because they are factors that are potentially remedial through health care (Bogduk & McGuirk, 2002). Research on psychological problems associated with chronic pain has tended to focus on depression, which is an important factor in patients experiencing chronic pain (Linton, 2000; Pincus, et al., 2002). Depression has been associated with chronic pain, a review of the co-morbidity of pain and depression reported the mean (range) prevalence of major depression in people experiencing pain among studies was 18%
in population based settings (number of studies = 6) 27% (5.9% to 46%) in primary care clinics (number of studies = 4) and 52% (1.5% to 100%) in pain clinics or inpatients (number of studies = 15) (Bair, Robinson, Katon, & Kroenke, 2003). The same review found pain to be a common factor in those with depression; the prevalence of pain ranged from 15% to 100% (mean prevalence, 65%) in those with depression (Bair, et al., 2003).

There is still some discrepancy in the literature about the role of anxiety in patients with chronic pain, with Linton’s (2000) review finding anxiety to be associated with chronic pain, whereas the review by Pincus et al. (2002) found that the evidence behind fear-anxiety association with chronic pain was scarce. As suggested by a recent consensus statement (Pincus, Santos, et al., 2008), these differing findings may highlight the need for more methodological rigour in the investigation of psychological factors in patients with chronic pain.

**Positive psychological factors**

Researchers investigating positive psychological factors have focussed largely on positive affect, optimism and resilience. Positive affect represents the degree to which a person feels enthusiastic, active, and alert (Watson, Clark, & Tellegen, 1988). A review of the relationship between positive affect and health suggested that positive affect as a trait is associated with lower morbidity and decreased reports of physical symptoms and pain, although methodological and theoretical limitations of the reviewed studies were reported (Pressman & Cohen, 2005). There is also some suggestion that positive affect lends a bias to the self-reporting of outcome due to its effects on perception, judgement and decision making (Pressman & Cohen, 2005). One possible explanation of the influence of positive affect on decreased reporting of pain is that opioids diminish the distresing and affective component of pain (Pressman & Cohen, 2005); other theories implicate neural systems as having a role in the emotional modulation of pain (Villemure & Bushnell, 2002).

A meta-analysis of studies investigations into optimism in relation to physical health found that optimism is a predictor of positive health outcomes in relation to physical symptoms and pain (Rasmussen, Scheier, & Greenhouse, 2009). Most of the studies that measured pain and physical symptoms in the review focused on cross-sectional and longitudinal studies using
self-reported measures, but there is also some evidence that optimism is linked with objective measures of good outcome (Rasmussen, et al., 2009).

Positive affect and optimism are both components of resilience (Sturgeon & Zautra, 2010). Resilience is differentiated by Sturgeon and Zautra (2010) into i) resilience resources, which are personality characteristics like optimism, acceptance and “purpose in life”; and ii) resilience mechanisms, which refer to cognitions, affects and behaviours employed at a time of stress. A recent study found that resilience, measured as both the ability to bounce back after stress and “purpose in life”, predicted increased habituation to thermal pain (both hot and cold pain) (B. W. Smith, et al., 2009). “Purpose in life” has been associated with recovery from total knee replacements; a study of 64 surgery patients with severe osteoarthritis of the knee, indicated that “purpose in life” was related to improved mental and physical health 6-months after surgery (B. Smith & Zautra, 2004).

The interaction of positive affect and negative affect

In contrast to positive affect, negative affect is a general state of subjective distress and unpleasurable engagement (Watson, et al., 1988). The relationship between positive affect and negative affect is one of contention in the literature (Pressman & Cohen, 2005). There is some evidence to suggest that positive affect and negative affect are bipolar extremes of a single dimension with high positive affect at one end and negative affect at the other (Russell & Carroll, 1999). The alternative perspective to this is that positive and negative affects exist as distinct dimensions that are relatively independent of each other (Watson, et al., 1988). According to Davis, Zautra, and Smith (2004) and Schmukle, Egloff, and Burns (2002) a more likely scenario is that it is an individual’s physical and mental condition which dictates whether positive and negative affect function independently or are inversely related. This scenario has been termed the ‘Dynamic Model of Affect’ and proposes that under conditions of maximal information processing, positive and negative affect function relatively independently. In contrast, under conditions of uncertainty like pain and stress, there is evidence to suggest that there is an inverse relationship between positive and negative affect (Davis, et al., 2004; Zautra, Johnson, & Davis, 2005; Zautra, Smith, Affleck, & Tennen, 2001).
Watson et al. (1988) developed the Positive Affect and Negative Affect Schedule (PANAS) to measure positive and negative affect. Although positive and negative affect have not been shown to have complete independence when measured with the PANAS, the PANAS has been shown to be a reliable and valid measure of these affects (J.R. Crawford & Henry, 2004; DePaoli & Sweeney, 2000; Melvin & Molloy, 2000). In order to remove some ambiguous terms and develop a more time effective tool, Thompson (2007) developed the international short form of the PANAS (I-PANAS-SF). A series of validation studies showed that the I-PANAS-SF is a psychometrically acceptable tool (Thompson, 2007).

The Depression Anxiety and Positive Outlook Scale

The DAPOS was developed to measure depression, anxiety and positive outlook in pain populations. In the development of the DAPOS, non-somatic items were selected or developed from the widely used Beck Depression Index (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the HADS (Zigmond & Snaith, 1983) in order to take advantage of the strengths and avoid some of the known weakness of the two scales (Pincus, et al., 2004). Pincus et al. (2004) pointed out three reasons for developing the scale. First, was to overcome contamination from somatic items as mentioned previously. Second, to provide a broad indicator of anxiety and depression; this identifies individuals requiring further assessment. Third, to measure positive outlook which may provide a separate dimension to negative or neutral mood states, that is absent from other psychological measuring tools designed for pain populations and which may be an important outcome measure.

It is not clear to what extent the subscale labelled Positive Outlook leans towards positive affect or towards optimism, which are related but different constructs (Rasmussen, et al., 2009). The naming of the Positive Outlook subscale implies an optimistic view but the items of the subscale may contain elements of both optimism and positive affect. The DAPOS has been shown to be a reliable measure of the three psychological states: depression, anxiety and positive outlook, demonstrating acceptable ability to measure these states through excellent construct validity. It has good responsiveness in a pain management setting, though further
validation of the Positive Outlook subscale is recommended (Pincus, Rusu, et al., 2008; Pincus, et al., 2004).

**Identification, assessment and management of psychological factors**

Chronic pain involves more than just the complaint of physical pain, making it necessary to assess a patient’s psychological well being; failure to do so can compromise patient management (Bogduk & McGuirk, 2002). There is no universally accepted protocol for psychological assessment of chronic pain in patients; it could be done by way of interview, questionnaire, or referral to specialists (Bogduk & McGuirk, 2002). The principles of osteopathy state the importance of viewing within the individual the interdependence of body, mind and spirit (Sammut & Searle-Barnes, 1998). While at present there are no osteopathic guidelines for assessing and managing a patient’s psychological wellbeing, the practitioner-patient interaction could elicit clues to the patient’s mood and their view of their current state of health. A recent unpublished study in New Zealand suggested that osteopath practitioners are less confident in managing patients with mood disorders due to a lack of knowledge (Sampath, 2007).

**Psychological factors in osteopathic and chiropractic patients**

The role that psychological factors may play in manual therapy has been conceptually discussed, but which factors are relevant in people presenting for manual therapy is not clear (A. K. Burton, McClune, Clarke, & Main, 2004). A prospective study in a UK osteopathic clinic that collected clinical and psychosocial data from 252 people presenting with low back pain found that psychosocial factors were more important than physical examination findings in predicting poor outcome (A. K. Burton, Tillotson, Main, & Hollis, 1995). In that study cognitive coping strategies were found to be predictive of disability at 1-year. However, when the cohort from this study was investigated an average of 4-years later, depressive symptoms explained 22% of the variance for poor outcome (A. K. Burton, et al., 2004). This follow-up study was limited by a 60% response rate. Of the 50.3% of respondents who sought further care, 56.5% continued receiving care from osteopathic clinics. It appears that depressive symptoms may
exert a long term influence on low back pain outcome, suggesting that depression needs to be considered by osteopathic clinicians (A. K. Burton, et al., 2004).

Research in the chiropractic setting has tended to focus on pain severity measures, rather than psychological factors to predict poor outcome (Langworthy & Breen, 2007). Langworthy and Breen (2007) investigated predictors of low back pain in a chiropractic clinic and found that patients had low levels of psychological distress in terms of anxiety, fear-avoidance, inevitability and risk of psychiatric disorders at baseline. This suggested that self-referred patients presenting at a chiropractic clinic may not have the same psychosocial predictors of poor outcome that are in other patients seeking health care for low back pain within the public system (Langworthy & Breen, 2007).

It has been suggested that patients presenting to osteopaths for back pain are similar to those presenting to general practitioners in terms of pain patterns, and distribution of age, sex, and occupation (A. Burton, 1981). However, differences have been noted between people with low back pain presenting to chiropractic clinics and general practitioner clinics. A study investigating characteristics of people with low back pain presenting to chiropractic clinics and general practitioner clinics in the USA found differences in patient socio-demographics and psychosocial and complaint characteristics (Nyiendo, Haas, Goldberg, & Sexton, 2001).

When the DAPOS was being developed it was tested on patients with chronic musculoskeletal pain in a pain management clinic and an osteopathic clinic; the osteopathic participants had lower depression and anxiety scores, and higher positive outlook scores when compared to the pain management clinic (Pincus, et al., 2004). These findings suggest that the depression and anxiety in patients presenting at that osteopathic clinic may be different to those who presented to the pain management clinic. Although, in the study done by Pincus et al. (2004) people presenting to the osteopathic clinic also reported lower levels of pain intensity than those presenting to the pain clinic and comparison between demographics was not reported.
Conclusion

With the biopsychosocial approach to the management of chronic pain it is becoming increasingly important to identify and manage obstacles to recovery. Depression and anxiety are psychological factors commonly found in the primary health setting. Depression is associated with chronic pain and has been linked with poor prognosis of pain problems. Positive cognitive and affective components are associated with positive health outcomes in relation to physical symptoms and pain. The DAPOS was developed to improve on the limitations of tools for measuring psychological factors in people experiencing pain. The developers of the DAPOS recommend employing the tool with another measure of positive affect to continue the validation process.

Presently there is limited data on the prevalence of psychological factors in patients presenting to osteopathic clinics and no data on the prevalence of psychological factors in patients presenting to osteopathic training clinics or osteopathic clinics in New Zealand.

The study reported in Section 2 of this thesis sought to measure the scores for depression, anxiety and positive outlook using the DAPOS in patients presenting to a New Zealand osteopathic training clinic, which could have implications for the training of osteopathic students as well as the management of patients presenting at osteopathic training clinics. The study also sought to test the convergent validity of the Positive Outlook subscale of the DAPOS with the Positive Affect subscale of the I-PANAS-SF.
References


Section 2: Manuscript

*Note*
This manuscript has been prepared in accordance with the Instructions for Authors for the International Journal of Osteopathic Medicine [see Appendix D]
Depression, Anxiety and Positive Outlook amongst patients presenting to an osteopathic training clinic: A prospective survey
Depression, Anxiety and Positive Outlook amongst patients presenting to an osteopathic training clinic: A prospective survey

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Abstract

Background: Depression and anxiety are associated with chronic musculoskeletal pain and its persistence, whereas positive psychological factors have been associated with decreased pain severity and interference. These psychological factors have an influence on the management and prognosis of patients with pain, yet there is a lack of data about the prevalence of these factors in osteopathic settings.

Objective: To investigate the scores of depression, anxiety and positive outlook in patients presenting to an osteopathic training clinic using the Depression, Anxiety and Positive Outlook Scale (DAPOS), and to further the process of validation of the Positive Outlook subscale of the DAPOS by comparing it with the International Positive and Negative Affect Schedule Short Form (I-PANAS-SF).

Method and Participants: A prospective survey was undertaken in an osteopathic training clinic. Questionnaires (n=600) were made available to a convenience sample of consenting patients aged 18 or over who presented to the clinic over a 5-month period in 2009. The questionnaire included 1) demographic information 2) clinical information and 3) psychological measures. A total of 274 participants completed questionnaires. Non-parametric data analysis methods were used as the data was not normally distributed.

Results: Data from 268 respondents was analysed. The median scores for both the Depression and Anxiety subscales of the DAPOS were low (Depression: median = 7; range = 5-24; interquartile range = 5; and Anxiety: median = 4; range = 3-15, interquartile range = 3). For the Positive Outlook subscale, the median score was moderate to high (Positive Outlook: median = 12; range = 3-15, interquartile range = 3). The Positive Outlook subscale correlated moderately with the Positive Affect subscale of the I-PANAS-SF (τ = 0.38, p≤0.001) indicating moderate convergent validity between these measures.

Conclusion: The low median scores for the Depression and Anxiety subscales of the DAPOS indicate that depression and anxiety may not be dominant factors impacting on the
management approach for the majority of patients in this setting. Further evidence is lent to the ability of the DAPOS to measure positive psychological factors alongside of negative measures.

*Keywords:* Depression; anxiety; osteopathy; osteopathic medicine
Introduction

With the biopsychosocial approach to management of people in pain, it is becoming increasingly important for clinicians to be able to screen for psychological factors that are associated with pain, and have an understanding of the impact of these factors in the clinical setting. Depression and anxiety are factors found in patients presenting to primary care practitioners; a study of New Zealand general practitioners found the prevalence of depression and anxiety to be 18.1% and 20.7% respectively.\(^1\) In a review of the prognostic factors for musculoskeletal pain, anxiety and/or depression were associated with poor outcome.\(^2\) There is an association between pain and depression; a review found that the prevalence of pain in a depressed sample and depression in a pain sample were higher than when these factors were individually examined.\(^3\) A systematic review looking for psychosocial predictors associated with the persistence of low back pain found strong evidence that depression plays a role in the transition from acute to chronic back pain.\(^4\) Another review implicated anxiety as a risk factor related to back and neck pain and disability,\(^5\) but further research is needed due to limited substantiating evidence. Furthermore, a recent study has implicated other psychological factors as being stronger predictors of disability of low back pain than depression and anxiety.\(^6\)

A study on predictors of long term outcome for low back pain suggested that patients presenting to a private chiropractic clinic for treatment of low back pain may not have the same psychosocial predictors of long term outcome as patients receiving health care for low back pain within the public system.\(^7\) When investigating predictors of persistent back pain in patients presenting at an osteopathic clinic, Burton et al.\(^8\) identified a cluster of psychosocial factors that were found to be more important than physical examination findings. In this study cognitive coping strategies were found to be predictive of disability at a 1-year follow-up;\(^8\) whereas at a 4-year follow-up depressive symptoms were predictive of disability.\(^9\) Burton et al.\(^8\) suggested that low back pain patients presenting to an osteopathic clinic were typical of those presenting to primary care physicians, although this suggestion was not based on studies that measured psychosocial factors when looking at similarities between the groups of patients. It is not clear whether psychosocial factors have the same prevalence and influence on people who present to private osteopathic clinics as they do on people presenting to public primary health care providers who have similar presenting problems.\(^9\)
It has been suggested that it is important to evaluate and manage psychological factors in people with pain presenting for osteopathic treatment.\(^\text{10}\) The Depression, Anxiety and Positive Outlook Scale (DAPOS) was developed for measuring depression, anxiety and positive outlook in people experiencing pain.\(^\text{11}\) This measuring tool was based on the widely used Beck Depression Inventory and the Hospital Anxiety and Depression Scale.\(^\text{11}\) The DAPOS has been shown to be a reliable measure of three mood states: depression, anxiety and positive outlook, although further validation of the Positive Outlook subscale has been recommended.\(^\text{11, 12}\)

The DAPOS was initially developed using people with chronic pain presenting to two different clinics: 1) a mostly self referred osteopathic clinic and 2) a pain management clinic.\(^\text{11}\) Those presenting to the osteopathic clinic appeared to have lower depression and anxiety scores and higher positive outlook scores as measured by the DAPOS. Currently there is limited data on the prevalence of psychological factors in patients presenting to osteopathic clinics, and none in relation to patients presenting to osteopathic training clinics.

The DAPOS provides a positive psychological measure labelled ‘Positive Outlook’ that may be better envisioned as a separate dimension rather than just an opposing pole of negative psychological states.\(^\text{11}\) Measurement of positive psychological factors are absent from other psychological measuring tools designed for pain populations.\(^\text{11}\) Positive psychological factors reported in the literature related to pain include positive affect\(^\text{13}\), optimism\(^\text{14}\) and resilience\(^\text{15}\). A review of the influence of positive affect on health found that positive affect is associated with decreased physical symptoms and pain, although literature in this area has methodological and theoretical limitations.\(^\text{13}\) Optimism is a predictor of positive health outcomes in relation to physical symptoms and pain.\(^\text{14}\) Resilience can be seen as encompassing both positive affect and optimism and is implicated in the recovery from the distress associated with pain.\(^\text{15}\) In order to continue the process of validation of the Positive Outlook subscale Pincus et al.\(^\text{12}\) recommend that the DAPOS should be utilised with other measures of positive affect like the Positive and Negative Affect Schedule (PANAS)\(^\text{16}\). Thompson\(^\text{17}\) developed the international PANAS Short Form (I-PANAS-SF) to remove some of the ambiguous and colloquial terms from the PANAS. Thompson\(^\text{17}\) reported that the I-PANAS-SF is a reliable, valid, and efficient means of
measuring positive affect and negative affect; these findings were based on two studies by the author that tested the measuring tool.\textsuperscript{17}

The aim of the current study is to 1) investigate the DAPOS scores for depression, anxiety and positive outlook in patients presenting to an osteopathic training clinic; and 2) to test the convergent validity of the DAPOS Positive Outlook subscale with the Positive Affect subscale of the I-PANAS-SF.
Materials and Methods

This prospective cross-sectional\textsuperscript{18} closed-format study was conducted at a training clinic of a New Zealand (NZ) osteopathic training institution, where mostly self-referred patients are treated by postgraduate students under the supervision of clinical tutors. Patients receive treatment at a reduced fee, which is approximately one third of the fee paid at non-training osteopathic clinics in NZ. In NZ patients are able to claim for compensation if the cause of injury is deemed an accident by the government's Accident Compensation Corporation (ACC)\textsuperscript{19}. ACC can contribute to a wide range of medical and related costs and may cover loss of earnings. At this training clinic ACC patients are charged approximately half of the consultation fee and represented 5.6% of the patients presenting to the clinic during the 5-month study period.

Patients may also be part of the Ministry of Health’s Green Prescription program, where patients have written advice from a doctor or practice nurse to be physically active, as part of the patient's health management.\textsuperscript{20} At this training clinic, Green Prescription patients are charged a quarter of the consultation fee if not working or half if working. Green Prescription patients represented 4.6% of the patients presenting to the clinic during the 5-month study period.

Participants

People presenting to the clinic over a 5-month period (from August 2009 to December 2009) were eligible to participate. This included both those that were new to the clinic and those returning for follow-up consultation. The inclusion criteria were: 1) at least 18 years of age and; 2) ability to read written English. Data from respondents who reported pain associated with cancer were excluded from data analysis.

Procedure

Questionnaires (n=600) and information sheets were printed and divided among the clinicians and secretarial staff to be distributed to patients. When it was convenient for the clinicians and staff, patients were made aware of the study and informed that they were under no obligation to participate. If patients were willing to proceed or wanted to know more about the study they were given the information sheets and questionnaires. Of the 600
questionnaires distributed to clinicians and staff: 300 were uncompleted, 274 were completed by patients and 26 were unaccounted for. The participants could fill out the questionnaires before, during (while the clinician was out of the consultation room), or sometime after the consultation; they were invited to return the questionnaires to a sealed collection box or post them back to the clinic in a self addressed postage-paid envelope. Implied consent was given with the submission of the questionnaires and no personally identifying information was gathered. Ethics approval was obtained from the Unitec Research Ethics Committee. For the purpose of comparison with the sample, the clinic administrator provided the age, gender, and fee charge data of all patients over the age of 18 presenting to the clinic during the 5 month study period.

**Measurements**

The questionnaire collected the following:

1. **Demographic Information**
   1.1. Age, gender, employment status, and highest level of education.

2. **Clinical Data**
   2.1. Pain intensity of current pain problem was measured using a 11 point numerical pain rating scale between 0-10 with the extremes of “no pain” and “worst pain possible”.
   2.2. Duration of the current pain problem was measured by asking “How long have you had your current pain problem?” (adapted from the Acute Low Back Pain Screening Questionnaire) with a choice of less than 6 weeks, between 6 weeks - 3 months, greater than 3 months, or not applicable.
   2.3. Location of primary pain (multi-choice: low back, shoulders/hands/arms, head/face, neck, pelvis, hips/legs/feet, chest/throat, abdomen) adapted from Pincus, Rusu et al.
   2.4. Patients were asked “Do you currently have any pain associated with cancer? (Yes/No)” as there are often other issues that may influence the assessment of psychological factors in participants with pain related to cancer.

3. **Psychological Measures**
3.1. Patients were also asked “Do you currently have any diagnosed psychiatric disorder? (Yes/No)”.

3.2. A single item measure for job satisfaction based on Kunin’s single item measure but without pictorial reference was used to rate general work satisfaction on a 7 point scale ranging from 1 being extremely satisfied to 7 being extremely dissatisfied;\textsuperscript{25}

3.3. The DAPOS has 11 questions containing 3 subscales for depression, anxiety and positive outlook. The subscales range from 5 to 25 for depression, 3 to 15 for anxiety, and 3-15 for positive outlook.\textsuperscript{11,12}

3.4. The I-PANAS-SF is a short form of the PANAS that has had some of its ambiguous and colloquial terms removed in order to be more relevant in an international setting.\textsuperscript{17} The I-PANAS-SF contains 10 questions and has 2 subscales: one for positive affect and one for negative affect, which both range from 5-25. In this study the scale was used to compare with the Positive Outlook subscale of the DAPOS.

**Data Analysis**

On completion of data collection the subscale scores for depression, anxiety and positive outlook from the DAPOS and the positive and negative affect subscales from the I-PANAS-SF were calculated. Participants who recorded insufficient data to complete at least one of the subscales from DAPOS and one of the subscales from the I-PANAS-SF were noted and excluded from further analysis. Inspection of the histograms and Q-Q plots as well as the Shapiro-Wilk\textsuperscript{26} test of normality for the DAPOS, I-PANAS-SF and age data ascertained that the data was not normally distributed, therefore medians, ranges and interquartile ranges were reported as descriptive statistics. Kendall’s tau\textsuperscript{27} was used for determining correlations between the subscales of the DAPOS and the subscales of the I-PANAS-SF. Data were excluded from the correlations pair wise. Participants whose subscale scores from the DAPOS and/or I-PANAS-SF were 3 standard deviations above or 3 standard deviations below the mean were considered outliers and were identified and the raw data was checked for reporting of diagnosed psychiatric disorders. A chi-square test\textsuperscript{28} of independence was performed to determine whether the gender distribution between the participants and patients presenting to
the clinic during the study were associated and a Mann-Whitney U test\textsuperscript{29} was used to test whether the age distribution was similar between these two samples. Means and standard deviations were included for the DAPOS and I-PANAS-SF in order to allow comparison with others studies. Statistical analysis was performed using SPSS v17.0 (SPSS Inc., Chicago IL).
Results

A total of 274 questionnaires were returned from the 600 that were distributed. Six questionnaires were excluded due to missing data from the subscales of the DAPOS and I-PANAS-SF, leaving 268 for further analysis. Respondent demographics are reported in Table 1. When comparing respondents to people presenting to the clinic during the 5-month period: the gender distribution did not differ, $\chi^2 (1, n = 903) = 0.05, p = 0.82$ but the distribution of age did differ, $U = 76447.5, p = 0.03, r = 0.07$. Most of the respondents had completed at least a secondary school or equivalent level of education and the majority were employed full time. Low back, neck and shoulders/hands/arms were the most common body regions for presenting complaint (see Table 2).

The data from the DAPOS and I-PANAS-SF along with data from the Pincus et al.\textsuperscript{11} and Thompson\textsuperscript{17} studies are shown in Table 3. Overall the Depression and Anxiety subscales of the DAPOS showed low scores for these factors in both the whole sample and those with chronic pain. The Positive Outlook subscale showed high scores in both the whole sample and those with chronic pain. A small number of respondents reported subscale scores that were high in either one or more of the negative psychological factors of depression, anxiety and negative affect (Table 4). Furthermore, a small number of respondents had low scores in positive outlook or/and positive affect.

The Positive Outlook subscale of the DAPOS correlated with the Positive Affect subscale of the I-PANAS-SF and the Positive Outlook subscale also correlated negatively with the Negative Affect subscale (Table 5). The correlation coefficients represent “medium” correlations according to Cohen’s criteria.\textsuperscript{30} The Negative Affect subscale of the I-PANAS-SF correlated with both the Depression and Anxiety Subscales of the DAPOS and the Positive Affect subscale of the I-PANAS-SF had a stronger negative correlation the Depression subscale than the Anxiety subscale (Table 5).
### Table 1. Demographic data of respondents and potential participants

<table>
<thead>
<tr>
<th></th>
<th>Respondents</th>
<th>Patients aged &gt; 18 years presenting to clinic during study period</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>n = 258</td>
<td>n = 653</td>
</tr>
<tr>
<td>Median</td>
<td>39</td>
<td>43</td>
</tr>
<tr>
<td>Interquartile range</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>Range</td>
<td>18-82</td>
<td>18-89</td>
</tr>
<tr>
<td><strong>Gender n (%)</strong></td>
<td>n = 251</td>
<td>n = 652</td>
</tr>
<tr>
<td>Male</td>
<td>93 (34.7)</td>
<td>247 (37.8)</td>
</tr>
<tr>
<td>Female</td>
<td>158 (59.0)</td>
<td>405 (62.0)</td>
</tr>
</tbody>
</table>
### Table 2. Descriptive data for the included participants (*n=268*)

#### Employment Status (*n=266*)

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed Full Time</td>
<td>118</td>
<td>44.0</td>
</tr>
<tr>
<td>Employed Part Time</td>
<td>42</td>
<td>15.7</td>
</tr>
<tr>
<td>Unemployed because of pain</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Unemployed for other reasons</td>
<td>11</td>
<td>4.1</td>
</tr>
<tr>
<td>Retired</td>
<td>21</td>
<td>7.8</td>
</tr>
<tr>
<td>Registered Disabled</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Student</td>
<td>50</td>
<td>18.7</td>
</tr>
<tr>
<td>Homemaker</td>
<td>10</td>
<td>3.7</td>
</tr>
<tr>
<td>Self Employed</td>
<td>9</td>
<td>3.4</td>
</tr>
<tr>
<td>Beneficiary</td>
<td>3</td>
<td>1.1</td>
</tr>
</tbody>
</table>

#### Work Satisfaction (*n=238*)

- **Mean ± SD**: 2.8 ± 1.3

#### Education (*n=257*)

<table>
<thead>
<tr>
<th>Education Level</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than Primary School Completed</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Primary School completed</td>
<td>10</td>
<td>3.7</td>
</tr>
<tr>
<td>Secondary school (or equivalent)</td>
<td>121</td>
<td>45.1</td>
</tr>
<tr>
<td>University Completed</td>
<td>70</td>
<td>26.1</td>
</tr>
<tr>
<td>Postgraduate study completed</td>
<td>43</td>
<td>16.0</td>
</tr>
<tr>
<td>Diploma</td>
<td>5</td>
<td>1.9</td>
</tr>
<tr>
<td>Certificate</td>
<td>7</td>
<td>2.6</td>
</tr>
</tbody>
</table>

#### Pain intensity (*n=268*)

- **Mean ± SD**: 5.2 ± 2.1

#### Pain Duration (*n=266*)

<table>
<thead>
<tr>
<th>Duration</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 6 weeks</td>
<td>83</td>
<td>31.0</td>
</tr>
<tr>
<td>6 weeks to 3 months</td>
<td>30</td>
<td>11.2</td>
</tr>
<tr>
<td>&gt; 3 months</td>
<td>145</td>
<td>54.1</td>
</tr>
<tr>
<td>Not applicable</td>
<td>8</td>
<td>3.0</td>
</tr>
</tbody>
</table>

#### Locations of major complaint (*n=267*)

<table>
<thead>
<tr>
<th>Location</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head/face</td>
<td>9</td>
<td>2.6</td>
</tr>
<tr>
<td>Neck</td>
<td>75</td>
<td>22.0</td>
</tr>
<tr>
<td>Chest/throat</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Shoulders/hands/arms</td>
<td>60</td>
<td>17.6</td>
</tr>
<tr>
<td>Upper Back</td>
<td>51</td>
<td>15.0</td>
</tr>
<tr>
<td>Low back</td>
<td>79</td>
<td>23.2</td>
</tr>
<tr>
<td>Abdomen</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Pelvis/buttocks</td>
<td>17</td>
<td>5.0</td>
</tr>
<tr>
<td>Hips/legs/feet</td>
<td>47</td>
<td>13.8</td>
</tr>
</tbody>
</table>

#### Psychiatric Disorder (*n=266*)

- **Yes**: 11 (4.1)
- **No**: 255 (95.1)

#### Pain Associated with Cancer (*n=268*)

- **Yes**: 0 (0)
- **No**: 268 (100.0)

---

* n varies from 268 for different descriptive categories because of missing information from questionnaire  
† Multiple responses allowed
Table 3. Medians, ranges, interquartile ranges, means and SD for the DAPOS, I-PANAS-SF, and PANAS for current study and means and SD for Pincus et al.\(^8\) and Thompson’s\(^17\) study

<table>
<thead>
<tr>
<th></th>
<th>Median</th>
<th>range</th>
<th>Interquartile range</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAPOS-D (n=266*)</td>
<td>7</td>
<td>5-24</td>
<td>5</td>
<td>8.2</td>
<td>3.4</td>
</tr>
<tr>
<td>(n=144) pain &gt; 3 mths</td>
<td>8</td>
<td>5-21</td>
<td>5</td>
<td>8.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Pincus et al.(^11) (n=204)</td>
<td></td>
<td></td>
<td></td>
<td>8.6</td>
<td>3.4</td>
</tr>
<tr>
<td>DAPOS-A (n=265)</td>
<td>4</td>
<td>3-15</td>
<td>3</td>
<td>5.0</td>
<td>2.5</td>
</tr>
<tr>
<td>(n=143) pain &gt; 3 mths</td>
<td>4</td>
<td>3-15</td>
<td>3</td>
<td>5.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Pincus et al.(^11) (n=204)</td>
<td></td>
<td></td>
<td></td>
<td>5.3</td>
<td>2.6</td>
</tr>
<tr>
<td>DAPOS-PO (n=265)</td>
<td>12</td>
<td>3-15</td>
<td>3</td>
<td>12.0</td>
<td>2.5</td>
</tr>
<tr>
<td>(n=143) pain &gt; 3 mths</td>
<td>12</td>
<td>3-15</td>
<td>4</td>
<td>11.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Pincus et al.(^11) (n=204)</td>
<td></td>
<td></td>
<td></td>
<td>11.8</td>
<td>2.4</td>
</tr>
<tr>
<td>I-PANAS-SF-PA (n=263)</td>
<td>18</td>
<td>6-25</td>
<td>4</td>
<td>18.3</td>
<td>3.4</td>
</tr>
<tr>
<td>Thompson(^17) (n=411)</td>
<td></td>
<td></td>
<td></td>
<td>19.7</td>
<td>2.6</td>
</tr>
<tr>
<td>PANAS-PA</td>
<td>32</td>
<td>10-50</td>
<td></td>
<td>31.3</td>
<td>7.6</td>
</tr>
<tr>
<td>Crawford and Henry(^31) (n=1003)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-PANAS-SF-NA (n=264)</td>
<td>9</td>
<td>5-22</td>
<td>3</td>
<td>9.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Thompson(^17) (n=411)</td>
<td></td>
<td></td>
<td></td>
<td>11.3</td>
<td>2.7</td>
</tr>
<tr>
<td>PANAS-NA</td>
<td>14</td>
<td>10-42</td>
<td></td>
<td>16.0</td>
<td>5.9</td>
</tr>
</tbody>
</table>

*\(n\) varies from 268 eligible participants because of incomplete data; DAPOS-D, Depression subscale of the DAPOS; DAPOS-A, Anxiety subscale of the DAPOS; DAPOS-PO, Positive Outlook subscale of the DAPOS; PA Positive Affect subscale of the I-PANAS-SF; NA Negative Affect subscale of the I-PANAS-SF; PANAS-PA, Positive Affect subscale of the PANAS; PANAS-NA, Negative Affect subscale of the PANAS

Table 4. The frequency of univariate outliers for the DAPOS and I-PANAS-SF

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Frequency of outliers reporting psychiatric disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAPOS-D ((z &gt; 3.0))</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>DAPOS-A ((z &gt; 3.0))</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>DAPOS-PO ((z &lt; -3.0))</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>PA ((z &lt; -3.0))</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>NA ((z &gt; 3.0))</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

DAPOS-D, Depression subscale of the DAPOS; DAPOS-A, Anxiety subscale of the DAPOS; DAPOS-PO, Positive Outlook subscale of the DAPOS; PA Positive Affect subscale of the I-PANAS-SF; NA Negative Affect subscale of the I-PANAS-SF

Table 5. Correlations between Positive Affect and Negative Affect with Depression, Anxiety and Positive Outlook

<table>
<thead>
<tr>
<th></th>
<th>DAPOS-D</th>
<th>DAPOS-A</th>
<th>DAPOS-PO</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>-.26 (n=261)</td>
<td>-.10 (n=260)</td>
<td>.38 (n=260)</td>
</tr>
<tr>
<td>P Value (two-tailed)</td>
<td>(\leq .001)</td>
<td>.035</td>
<td>(\leq .001)</td>
</tr>
<tr>
<td>NA</td>
<td>.51 (n=262)</td>
<td>.35 (n=261)</td>
<td>-.29 (n=261)</td>
</tr>
<tr>
<td>P Value (two-tailed)</td>
<td>(\leq .001)</td>
<td>(\leq .001)</td>
<td>(\leq .001)</td>
</tr>
</tbody>
</table>

P-values represent correlation significance; DAPOS-D, Depression subscale of the DAPOS; DAPOS-A, Anxiety subscale of the DAPOS; DAPOS-PO, Positive Outlook subscale of the DAPOS; PA Positive Affect subscale of the I-PANAS-SF; NA Negative Affect subscale of the I-PANAS-SF
Discussion

Summary of key findings

The aim of this study was to measure the DAPOS scores of Depression, Anxiety and Positive Outlook in patients presenting to an osteopathic training clinic and to compare the Positive Outlook subscale of the DAPOS with the Positive Affect subscale of I-PANAS-SF. As a whole, patients with and without chronic pain presenting to the osteopathic training clinic had low scores of Depression and Anxiety and high scores of Positive Outlook as measured by the subscales of the DAPOS. These findings indicate that depression and anxiety may not be psychological factors that impact highly on this patient population. The high scores of Positive Outlook may have implications for positive influences on recovery.

The convergent validity of the Positive Outlook subscale of the DAPOS was evaluated by comparison with the I-PANAS-SF. As the DAPOS is still a relatively new tool it was deemed necessary to test the convergent validity of the Positive Outlook scale. As expected, the Positive Outlook subscale correlated positively with the Positive Affect subscale of the I-PANAS-SF and the Positive Outlook subscale correlated negatively with the Negative Affect subscale of the I-PANAS-SF. These correlations lend further support to the DAPOS being a valid tool for measuring positive psychological factors in pain populations.

Comparison with other studies

The authors of a study that investigated psychosocial predictors of poor outcome in patients presenting to a private UK chiropractic clinic with low back pain, found that at baseline, patients had low levels of psychological distress in terms of anxiety, fear and avoidance, inevitability and risk of psychiatric disorders. While chiropractic and osteopathy differ in philosophy they appear to have a similar patient base in terms of clinical and demographic variables. Langworthy and Breen have previously suggested that patients presenting to a private chiropractic clinic may not have the same psychosocial predictors of poor outcome in relation to low back pain as patients presenting to public health care. A review of psychological factors involved with the transition from acute to chronic low back pain implicated distress,
depressive mood, and somatisation in this process. However, of the 25 studies reviewed, only one study involved patients from an osteopathic clinic.

The mean scores for each of the subscales of the DAPOS in patients presenting to the osteopathic training clinic in our study were similar to those in a mostly self referred private UK osteopathic clinic. The mean DAPOS scores in our study remained similar to Pincus et al.’s findings even when only those with chronic pain were analysed. A limitation of this comparison is that the two studies used different criteria for chronic pain. The criterion in the current study was pain persisting longer than 3 months whereas in the criteria used by Pincus et al. was “troublesome, localised or generalised, musculoskeletal pain that has affected individuals for more than half the days in the previous 12 months”. A further limitation of this comparison is that the present study data was found to be not normally distributed and included a small number of outliers who reported high scores in depression and/or anxiety. The distribution of data were not reported in the study by Pincus et al. Caution should be applied in generalising the findings from the osteopathic training clinic to other osteopathic clinics as it is not known whether they represent differing patient populations in terms of psychosocial factors.

The means scores for the I-PANAS-SF appear to be similar to a sample from the general population used in a study by Thompson who undertook validation studies of the I-PANAS-SF instrument. The sample used by Thompson was family and friends of international university students studying in Japan; no pain data or other clinical information was gathered in this study. The similarity of the scores from the I-PANAS-SF suggests that the osteopathic training clinic population may have similar levels of Positive Affect and Negative Affect as a sample from the general population that is not necessarily experiencing any pain. This comparison is limited in terms of the ability to generalise the sample used in the study by Thompson to those not necessarily experiencing any pain. The comparison also has the same limitation mentioned previously of the data in the present study not being normally distributed.

A study by Crawford and Henry to establish normative PANAS data from a non-clinical sample collected PANAS and demographic data from 1003 members of the general adult population. The Positive Affect and Negative Affect subscales of the I-PANAS-SF consist of 5 of the 10 items from the PANAS, therefore raw scores reported from the I-PANAS-SF would be
expected to be half those from the PANAS. It is reasonable to expect that subscales scores of
the I-PANAS-SF would be fairly comparable to the corresponding subscale scores on the PANAS.
The median and mean Positive and Negative Affect scores for I-PANAS-SF from the present
study if doubled, were similar but slightly higher than Crawford and Henry’s\(^{31}\) non-clinical
sample. The slightly higher scores recorded by the I-PANAS-SF in the present study may
represent the removal of colloquial and ambiguous terms and retention of the higher loading
items from exploratory factor analyses in the development of the I-PANAS-SF,\(^{17}\) or the higher
scores may simply be a function of the different samples. Crawford and Henry\(^{31}\) produced a
conversion table to allow the conversion of raw scores to percentiles for both PANAS subscales.
The median scores of the I-PANAS-SF in the present study if doubled represent the 72 and 74
percentile for the Positive Affect and Negative Affect respectively using Crawford and Henry’s\(^{31}\)
conversion table. Caution should be taken in applying scores from the I-PANAS-SF to Crawford
and Henry’s\(^{31}\) conversion table due to the differences between the I-PANAS-SF and the PANAS.
It would be useful to establish normative data for clinical and non-clinical populations for both
the I-PANAS-SF and the DAPOS.

Low Positive Affect is suggestive of depressive symptoms, whereas Negative Affect
shares characteristics of both depression and anxiety.\(^{33, 34}\) The data from this study supported
these suggestions as the Negative Affect subscale correlated with both the Depression and
Anxiety subscales and the Positive Affect subscale had a stronger negative correlation with the
Depression subscale than the Anxiety subscale. As a whole, patients at the osteopathic training
clinic had high scores of Positive Affect and low scores of Negative Affect as measured by the I-
PANAS-SF. This lends further weight to the suggestion that depression may not be a common
feature at this training clinic.

**Limitations**

Not all patients presenting to the clinic were recruited into the study so there is a
potential for sample bias. Although, 42% of the patients presenting to the clinic during the 5-
month study period were recruited, there is no reason to believe that our study sample
differed from patients presenting during the study period.
A limitation is that this study was not designed to control for any impact that osteopathic management may have on mood. There was no control for the stage of management that the patient was at when participating in the study, so the patient’s consultation could range from their first consultation to the end of a management plan. Also, patients were able to fill out the questionnaire before, after or during consultation which could also influence the way in which the questionnaire was completed as treatment on the day may influence the patient’s psychological wellbeing. It is not known to what extent psychological factors were actively managed through osteopathic management or through any other form of co-management. A limitation of the DAPOS, and therefore a limitation of the study, is that the DAPOS has not received the extensive validation that the scales that it is based on have had.35, 36

Implications for clinical practice

Distress, depressive mood, and somatisation have been linked to the transition from acute to chronic pain, so it is important to recognise or know which patients presenting for osteopathic management may have a co-morbid psychiatric disorder or are displaying negative mood states as this may require early intervention to decrease the likelihood of developing chronic pain. While depression and anxiety symptoms may not be as common in patients presenting for osteopathic treatment at this training clinic as those presenting to some other primary health providers, it may still be important to selectively screen for these factors as there were a small number of participants who reported scores suggestive of the presence of depression and/or anxiety. This suggests depression and anxiety may be important but not common features of some patients presenting to this training clinic, although clinically relevant cut off points for the DAPOS have yet to be defined.12 Furthermore, those that did report high subscale scores of depression and/or anxiety did not necessarily report having been diagnosed with a psychiatric disorder. It has been suggested that patients reporting chronic pain who present for osteopathic treatment should have their functional and work concerns addressed; informal inquiries should be made into psychosocial factors, and consideration given to formal screening using a tool such as the DAPOS.10 Identification, assessment and management of
psychological factors associated with chronic pain are recommended to be part of osteopathic training.

Identification, assessment and management of psychological factors associated with chronic pain in an osteopathic setting are recommended to not just focus on depression and anxiety. A recent study that investigated psychological obstacles to recovery in low back pain patients in primary care identified four cognitive factors related to self regulation and self efficacy that explained 56.6% of the variance in disability at 6 months. These were expectations of the persistence of back pain, low confidence in ability to perform normal activities when in pain, beliefs of low personal control of back problems, and beliefs about many symptoms being related to back problem. These four factors were found to be better predictors of disability at 6-months than fear avoidance, catastrophising or depression, although these were still related to pain disability at 6-months when analysed separately. On the basis of these findings Foster et al. have highlighted the need for screening of psychological factors in patients with low back pain to extend beyond depression and anxiety.

Implications for further research

The high scores of Positive Outlook in patients presenting to this training clinic could be an indicator of a low burden of pain problems in the majority of patients presenting for treatment at this clinic. However, it is not clear to what extent the subscale that Pincus et al. labelled Positive Outlook leans towards positive affect or towards optimism, which are related, but not identical constructs. The Positive Outlook subscale consists of three closed format questions from the Depression subscale of the Hospital Anxiety and Depression Scale (HADS). The three questions from the HADS are: “I feel cheerful”, “I look forward with enjoyment to things” and “I can laugh and see the funny side of things”. In the HADS, an absence or lack of the particular positive mood or feeling indicates anhedonia, a loss of pleasure response, which is a central feature of depression. In the development process of the DAPOS, Pincus et al. found that answers to these questions loaded independently to other depression items when testing the HADS on 940 chronic pain patients. Pincus et al. relabelled these independently loading factors as Positive Outlook. The label “Positive Outlook” suggests a sense of optimism
but the subscale also contains items relating to affect. The moderate correlation between the Positive Outlook subscale and the Positive Affect subscale in the present study suggests that the two scales are measuring constructs that are related but not the same. Further research into the role of Positive Outlook in relation to treatment and outcome of those in pain would be useful.\textsuperscript{12}

Further research is recommended to investigate whether the prevalence of psychological factors associated with chronic pain differs between people seeking treatment at different primary health care facilities. It would be particularly useful to investigate whether self-efficacy differs between different primary health care facilities.\textsuperscript{7} Foster et al.\textsuperscript{6} found factors related to low self-efficacy were important in predicting poor outcome in low back pain patients presenting to general practitioners. Furthermore, a study undertaken in 14 general practice and 51 chiropractic clinics investigating patients' self-management attitudes and behaviours in relation to low back pain, suggested that chiropractic patients were characterised by greater self-efficacy motivation, a precursor to self-efficacy, than patients presenting to general practice.\textsuperscript{38} Although, it was not known in the study whether the greater self-efficacy motivation was a result of chiropractic clinicians encouraging self-efficacy motivation or whether self-efficacy motivation was a characteristic of those presenting to these chiropractic clinics.\textsuperscript{38} Furthermore, self-efficacy motivation was measured in this study by the strength of the response to one question regarding knowing what to do to take care of one’s back after the visit with the clinician. From the results of this study it is inconclusive whether self-efficacy differs between people with low back pain presenting at general practice clinics and chiropractic clinics.

Conclusion

Depression is associated with chronic pain and is often encountered in primary health settings. Depression also plays a role in the transition from acute to chronic low back pain. Low scores for depression were reported in the private osteopathic training clinic suggesting minimal overall impact of depression in patients with chronic pain presenting to the clinic. Depression and anxiety as measured by the DAPOS appear to be uncommon features of patients presenting to this osteopathic training clinic. The moderate convergence validity of
the Positive Outlook subscale of the DAPOS with the I-PANAS-SF provides further evidence for the ability of the DAPOS to measure positive psychological factors.
References


Section 3: Appendices
Appendix A: Information for Participants

Measuring patient’s mood in an osteopathic teaching clinic

My name is Richard Clarke and I am a student of the Master of Osteopathy programme at Unitec. I invite you to be part of a research project that is part of my master’s programme. My research topic looks at measuring the mood of patients presenting to an osteopathic teaching clinic. My supervisors are Robert Moran and Dianne Roy.

What is the project about?
We want to find out how common various mood states in people presenting to Unitec’s osteopathic teaching clinic. We also wish to continue the development of a questionnaire for people receiving health care.

What it will mean for you?
The attached is a questionnaire that can be filled out at any time and takes about 10 minutes to complete. The questionnaire will ask you to identify how you have been feeling lately in relation to various mood states, to which one answers on a scale between never and always. The survey will also ask demographic questions BUT YOUR NAME OR OTHER IDENTIFYING DATA IS NOT REQUESTED OR RECORDED.

Participation in this survey is completely voluntary. Declining will have no influence over access to services at Unitec and the clinic.

Responses can be put in the green box at reception or a self addressed envelope is available if you wish to post in your questionnaire. Final return date for the questionnaire is 21/12/2009.

What are the outcomes from the study?
By taking part you will help generate profiles of patients that present at an osteopathic teaching clinic. This information is useful in determining how we can better serve health care needs. A report on the preliminary finding of this survey will be available to you in January 2010 should you be interested by emailing the principal researcher (see below) and the results of this study may be published in relevant journals.

Consent
If you agree to participate, submission of the questionnaire will be taken as your consent to participate.
Please contact myself or my supervisor if you need more information about the project or have any concerns:

Richard Clarke (principal researcher) rclarke10@hotmail.com
Rob Moran (principal supervisor) rmoran@unitec.ac.nz
Dianne Roy (supervisor) droy@unitec.ac.nz

Survey responses are anonymous
The survey is completely anonymous – we don’t ask for, or record your name or gather or present survey responses in such a way that any individual can be identified.

Thank you!

UREC REGISTRATION NUMBER: 2009.977
This study has been approved by the UNITEC Research Ethics Committee from 24/7/2009 to 24/7/2010. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee through the UREC Secretary (ph: 09 815-4321 ext 6162). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Appendix B: Ethics Approval for this Project

Richard Clarke

27 July 2009

Dear Richard

Your file number for this application: 2009-977
Title: *What is the prevalence of depression, anxiety and positive outlook in patients presenting at an osteopathic teaching clinic?*

Your application for ethics approval has been reviewed by the Unitec Research Ethics Committee (UREC) and has been approved for the following period:

Start date: 24 July 2009
Finish date: 24 July 2010

Please note that:
1. the above dates must be referred to on the information AND consent forms given to all participants
2. you must inform UREC, in advance, of any ethically-relevant deviation in the project. This may require additional approval.

You may now commence your research according to the protocols approved by UREC. We wish you every success with your project.

Yours sincerely

[Signature]

Deborah Rolland
Deputy Chair, UREC

CC: Rob Moran
    Cynthia Almeida
Appendix C: Questionnaire

1. What is the year of your birth? [ ]

2. What is your gender?
   - Male [ ]
   - Female [ ]

3. What is your employment status? (mark one only)
   - Employed full time [ ]
   - Employed part time [ ]
   - Unemployed because of pain [ ]
   - Unemployed for other reasons [ ]
   - Retired [ ]
   - Registered disabled [ ]
   - Student [ ]
   - Homemaker [ ]
   - Other (please specify) [ ]

4. What is the highest level of education that you have completed (mark one only)
   - No formal schooling [ ]
   - Less than primary school [ ]
   - Primary school completed [ ]
   - Secondary school (or equivalent) completed [ ]
   - University completed [ ]
   - Postgraduate degree completed [ ]
   - Other (please specify) [ ]

5. How satisfied are you with your work in general? (mark one only)
   - 1. Extremely satisfied [ ]
   - 2 [ ]
   - 3 [ ]
   - 4 [ ]
   - 5 [ ]
   - 6 [ ]
   - 7. Extremely dissatisfied [ ]
   - N/A [ ]

6. Select the number that best describes your pain during the past 24 hours (mark one only)
   - 0. No Pain [ ]
   - 1 [ ]
   - 2 [ ]
   - 3 [ ]
   - 4 [ ]
   - 5 [ ]
   - 6 [ ]
   - 7 [ ]
   - 8 [ ]
   - 9 [ ]
   - 10. Pain worst possible [ ]

7. How long have you had your current pain problem? (mark one only)
   - Less than 6 weeks [ ]
   - Between 6 weeks - 3 months [ ]
   - Greater than 3 months [ ]
   - Not Applicable [ ]

8. What is the location of your major complaint? (mark one only)
   - Head/face [ ]
   - Neck [ ]
   - Chest/throat [ ]
   - Shoulders/hands/arms [ ]
   - Upper Back [ ]
   - Low back [ ]
   - Abdomen [ ]
   - Pelvis/buttocks [ ]
   - Hips/legs/feet [ ]
   - Other (please specify) [ ]

9. Do you currently have any pain associated with cancer?
   - Yes [ ]
   - No [ ]

10. Do you currently have any diagnosed psychiatric disorders?
    - Yes [ ]
    - No [ ]

(Please Turn Over)
11. We would like to know how you have been feeling in the last few weeks. Please mark a number for each statement indicating how often you feel that way.

<table>
<thead>
<tr>
<th></th>
<th>1 Almost never</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Almost all the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel like a failure</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I get a frightened feeling, as if something awful is about to happen</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I feel guilty</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4. I can laugh and see the funny side of things</td>
<td>○</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>5. I am disappointed in myself</td>
<td>○</td>
<td></td>
<td></td>
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<tr>
<td>6. I get a frightened feeling, like butterflies in the stomach</td>
<td>○</td>
<td></td>
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<tr>
<td>7. I feel cheerful</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>8. I blame myself constantly</td>
<td>○</td>
<td></td>
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<tr>
<td>9. I get a sudden feeling of panic</td>
<td>○</td>
<td></td>
<td></td>
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<tr>
<td>10. I look forward with enjoyment to things</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I think about harming myself</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate number answer next to that word.

12. Thinking about yourself and how you normally feel, to what extent do you generally feel:

<table>
<thead>
<tr>
<th></th>
<th>1. Never</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5. Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upset</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hostile</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alert</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ashamed</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspired</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nervous</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determined</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attentive</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Afraid</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>○</td>
<td></td>
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</table>
Appendix D: Guidelines for Submission to the International Journal of Osteopathic Medicine (IJOM)
Former title: Journal of Osteopathic Medicine

Guide for Authors
The journal Editors welcome contributions for publication from the following categories: Letters to the Editor, Reviews and Original Articles, Commentaries and Clinical Practice case studies with educational value.

Online Submission
Submission to this journal proceeds totally online. (http://ees.elsevier.com/ijom) you will be guided stepwise through the creation and uploading of the various files. The system automatically converts source files to a single Adobe Acrobat PDF version of the article, which is used in the peer-review process. Please note that even though manuscript source files are converted to PDF at submission for the review process, these source files are needed for further processing after acceptance. All correspondence, including notification of the Editor’s decision and requests for revision, takes place by e-mail and via the Author’s homepage, removing the need for a hard-copy paper trail.

The above represents a very brief outline of this form of submission. It can be advantageous to print this "Guide for Authors" section from the site for reference in the subsequent stages of article preparation.

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, without the written consent of the Publisher.

Types of contributions
Letters to the Editor As is common in biomedical journals the editorial board welcomes critical response to any aspect of the journal. In particular, letters that point out deficiencies and that add to, or further clarify points made in a recently published work, are welcomed. The Editorial Board reserves the right to offer authors of papers the right of rebuttal, which may be published alongside the letter.

Reviews and Original Articles These should be either i) reports of new findings related to osteopathic medicine that are supported by research evidence. These should be original, previously unpublished works. The report will normally be divided into the following sections: abstract, introduction, materials and methods, results, discussion, conclusion, references. Or ii) critical or systematic review that seeks to summarise or draw conclusions from the established literature on a topic relevant to osteopathic medicine.

Short review The drawing together of present knowledge in a subject area, in order to provide a background for the reader not currently versed in the literature of a particular topic. Shorter in length than and not intended to be as comprehensive as that of the literature review paper. With more emphasis on outlining areas of deficit in the current literature that warrant further investigation.

Research Note Findings of interest arising from a larger study but not the primary aim of the research endeavour, for example short experiments aimed at establishing the reliability of new equipment used in the primary experiment or other incidental findings of interest, arising from, but not the topic of the primary research. Including further clarification of an experimental protocol after addition of further controls, or statistical reassessment of raw data.

Preliminary Findings Presentation of results from pilot studies which may establish a solid basis for further investigations. Format similar to original research report but with more emphasis in discussion of future studies.
and hypotheses arising from pilot study.

**Commentaries** Include articles that do not fit into the above criteria as original research. Includes commentary and essays especially in regards to history, philosophy, professional, educational, clinical, ethical, political and legal aspects of osteopathic medicine.

**Clinical Practice** Authors are encouraged to submit papers in one of the following formats: Case Report, Case Problem, and Evidence in Practice.

**Case Reports** usually document the management of one patient, with an emphasis on presentations that are unusual, rare or where there was an unexpected response to treatment eg. an unexpected side effect or adverse reaction. Authors may also wish to present a case series where multiple occurrences of a similar phenomenon are documented. Preference will be given to reports that are prospective in their planning and utilise Single System Designs, including objective measures.

The aim of the **Case Problem** is to provide a more thorough discussion of the differential diagnosis of a clinical problem. The emphasis is on the clinical reasoning and logic employed in the diagnostic process.

The purpose of the **Evidence in Practice** report is to provide an account of the application of the recognised Evidence Based Medicine process to a real clinical problem. The paper should be written with reference to each of the following five steps: 1. Developing an answerable clinical question. 2. The processes employed in searching the literature for evidence. 3. The appraisal of evidence for usefulness and applicability. 4. Integrating the critical appraisal with existing clinical expertise and with the patient’s unique biology, values, and circumstances. 5. Reflect on the process (steps 1-4), evaluating effectiveness, and identifying deficiencies.

**Presentation of Typescripts**

Your article should be typed on A4 paper, double-spaced with margins of at least 3cm. Number all pages consecutively beginning with the title page.

To facilitate anonymity, the author’s names and any reference to their addresses should only appear on the title page. Please check your typescript carefully before you send it off, both for correct content and typographic errors. It is not possible to change the content of accepted typescripts during production.

Papers should be set out as follows, with each section beginning on a separate page:

**Title page**
To facilitate the peer-review process, two title pages are required. The first should carry just the title of the paper and no information that might identify the author or institution. The second should contain the following information: title of paper; full name(s) and address(es) of author(s) clearly indicating who is the corresponding author; you should give a maximum of four degrees/qualifications for each author and the current relevant appointment only; institutional affiliation; name, address, telephone, fax and e-mail of the corresponding author; source(s) of support in the form of funding and/or equipment.

**Keywords**
Include three to ten keywords. These should be indexing terms that may be published with the abstract with the aim of increasing the likely accessibility of your paper to potential readers searching the literature. Therefore, ensure keywords are descriptive of the study. Refer to [http://www.nlm.nih.gov/mesh/meshhome.html](http://www.nlm.nih.gov/mesh/meshhome.html) for the MeSH thesaurus.

**Abstract**
Both qualitative and quantitative research approaches should be accompanied by a structured abstract. Commentaries and Essays may continue to use text based abstracts of no more than 150 words. All original articles should include the following headings in the abstract as appropriate: **Background, Objective, Design, Setting,**
Methods, Subjects, Results, and Conclusions. As an absolute minimum: Objectives, Methods, Results, and Conclusions must be provided for all original articles. Abstracts for reviews of the literature (in particular systematic reviews and meta-analysis) should include the following headings as appropriate: Objectives, Data Sources, Study Selection, Data Extraction, Data Synthesis, Conclusions. Abstracts for Case Studies should include the following headings as appropriate: Background, Objectives, Clinical Features, Intervention and Outcomes, Conclusions.

Text
The text of observational and experimental articles is usually, but not necessarily, divided into sections with the headings; introduction, methods, results, results and discussion. In longer articles, headings should be used only to enhance the readability. Three categories of headings should be used:

• major ones should be typed in capital letter in the centre of the page and underlined
• secondary ones should be typed in lower case (with an initial capital letter) in the left hand margin and underlined
• minor ones typed in lower case and italicised

Do not use 'he', 'his' etc. here the sex of the person is unknown; say 'the patient' etc. Avoid inelegant alternatives such as 'he/she'. Avoid sexist language.

References
Responsibility for the accuracy of bibliographic citations lies entirely with the Authors.

Citations in the text: Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Avoid using references in the abstract. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either "Unpublished results" or "Personal communication" Citation of a reference as "in press" implies that the item has been accepted for publication.

Text: Indicate references by superscript numbers in the text. The actual Authors can be referred to, but the reference number(s) must always be given.

List: Number the references in the list in the order in which they appear in the text.

Examples:

Reference to a journal publication:


Reference to a book:


Reference to a chapter in an edited book:


Note shortened form for last page number. e.g., 51-9, and that for more than 6 Authors the first 6 should be listed followed by "et al." For further details you are referred to "Uniform Requirements for Manuscripts submitted to Biomedical Journals" (J Am Med Assoc 1997;277:927-934) (see also }{
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