Behavioural management of migraine

Helen Brown, Craig Newman, Rupert Noad¹, Stuart Weatherby²

Clinical Psychology Doctorate Programme, Plymouth University, ¹Department of Neuropsychology, ²Department of Neurology, Derriford Hospital, Plymouth, UK.

Abstract

It is important to recognise that migraine is a ‘biological’ and not a ‘psychological’ entity. However, psychological factors can be involved in migraine in 4 different ways: 1) Migraines can be triggered by psychological stressors; 2) Severe migraine can itself be a cause of significant psychological stress which can, in turn, exacerbate the problem; 3) Even if psychological stress is not significantly involved in the genesis of the headache, pain management techniques can help people cope with their pain more effectively; 4) Longitudinal data demonstrate a complex bidirectional association between mood disorders and migraine. Treatment of a co-existing mood disorder, for example with cognitive behavioural techniques, may therefore reduce the impact of migraine. It would thus appear logical to view medical and psychological approaches as potentially synergistic rather than mutually exclusive. Functional imaging indicates that cognition, emotions, and pain experiences change the way the brain processes pain inputs. This may provide a physiological rationale for psychological interventions in pain management. As most studies of psychological management of migraine have been relatively small and the approach often varies between clinicians, the magnitude of benefit, optimum method of delivery, and the length of intervention are uncertain.

Key Words

Cognitive behavioural therapy, migraine, psychological, psychology

Introduction

It is most accurate, and in medical practice more helpful, to describe headache disorders as primarily ‘biological’ entities. Pain is real. However, psychological factors frequently co-exist with many headache disorders, and behavioural or cognitive techniques can also be beneficial even if there are no significant psychological problems. For example, it has been recommended that all children with headaches should be routinely offered psychological treatment.[¹]

Physical and psychological medicine might be viewed as two siblings separated at birth. They have acquired different languages and traditions, and are now often viewed as separate and distinct entities. One has become stigmatized. However, when techniques such as functional magnetic resonance imaging (fMRI) demonstrate that both have a physiological basis, such a dichotomy would seem to be erroneous. In chronic migraine the interaction between ‘psychological’ and ‘physical’ factors appears particularly complex.

For those disabled by chronic headache disorders, the most frequently used treatment approach is pharmacotherapy alone. However, for a significant minority there is limited benefit.[²,³] One reasonable conclusion would be that there is a need for more effective pharmaceutical agents. In addition it must also be acknowledged that there are significant data indicating that psychological strategies (including behavioural techniques: relaxation, bio-feedback, implementing lifestyle alterations and routines; cognitive techniques: awareness of patterns, observing thinking styles, motivation for change and boosting locus of control; psycho-education techniques: understanding the aetiology of headache, triggers, maintenance etc.) can help a large number of sufferers. These treatments are frequently underused. This article explores the evidence for psychological management of migraine and is based round the bio-psycho-social model.

Migraine - a common problem

Primary headache disorders account for 4% of all primary care consultations[⁴] and are estimated to cost the UK economy around £2 billion each year.[³] Migraine affects 18.3% of females and 7.6% of males in England, totalling an estimated 8 million people.[³] It has a significant impact on quality of life, comparable to that of diabetes or arthritis,[⁵] but leads to...
Despite the reluctance of sufferers to seek consultation, up to 30% of referrals to neurologists are for headaches. Headache is clearly a common problem and developing a breadth of treatment interventions may prove beneficial, not only to provide choice to headache sufferers but also to support those professionals caring for this group of people.

Interaction between pain perception and psychological factors

The gate control theory (GCT) of pain suggests that the perception of pain is an integration of peripheral stimuli and cortical variables such as mood and anxiety. Longitudinal data argue that the association between mood disorders and migraine is bidirectional. For example, Breslau and colleagues found that migraine increased the risk of a subsequent episode of major depression but that the presence of major depression also increased the risk of subsequently developing migraine. The existence of such a bi-directional relationship would argue that psychological techniques could have a place in the management of migraine patients, even those without overt psychopathology. This is further supported by findings that the chronic experience of headache itself is a stressor. Having chronic headache may render the sufferer more susceptible to new headaches. The mechanistic explanation relates in part to theories of central sensitisation, and offers a further rationale for the use of psychological techniques.

The reported efficacy of pharmacological interventions, psychological interventions and combined approaches vary across cohorts but also support a multipronged approach to headache management. The Cochrane Review for Paediatric Headache reports efficacy for psychological treatments such as Relaxation and Cognitive-Behavioural Therapy (CBT). The NICE guidelines for Headache, (due out in December 2012) will also be considering non-pharmacological interventions.

Biological rationale for psychological interventions in pain

Functional magnetic resonance imaging (fMRI) is offering an increasing insight into the biological mechanisms involved in primary headaches. Similarly fMRI is also providing biological explanations for the effect of psychological interventions in pain management.

Increasing data support the idea that cognitive and emotional activity, such as hyper vigilance to potential pain and fear of re-injury, can amplify pain perception. For example, in a study using fMRI, researchers demonstrated that distinct areas of the brain are involved in pain processing versus pain anticipation. More importantly, although the level of brain activation in the regions associated with sensory pain processing remained stable across time, the level of activation in the more cognitive–emotional pain anticipation regions increased over time. Thus it appears that cognition, emotions, and pain experiences change the way the brain processes input from pain receptors. For example, techniques such as distraction have been shown to reduce pain. fMRI scans suggest that these techniques work by increasing activation in the affective division of the anterior cingulate cortex and orbitofrontal regions, while reducing activation in many areas of the pain matrix (thalamus, insula, and cognitive division of the anterior cingulate). Further support for these techniques is provided by findings taken from real time fMRI in which subjects were found to be able to control activation in the rostral anterior cingulate. When subjects deliberately altered activation in this region there was a corresponding change in the perception of pain caused by an applied painful stimulus. The ability to regulate the emotional response to aversive situations is also important in minimizing disability. Cognitive reappraisal of highly negative scenes can reduce the adverse experience, and are associated with increased activation of the lateral and medial prefrontal regions and decreased activation of the amygdala and medial orbito-frontal cortex. This suggests that the prefrontal cortex is involved in constructing reappraisal strategies that can modulate activity in multiple emotion processing systems.

Intriguingly, data from paediatric anxiety disorders also indicate fMRI can predict which patients will respond to behavioural interventions.

Bio-psycho-social model

First proposed by Engel, the bio-psychosocial approach reflects the complex relationship between psychological, social and biological factors. A bio-psychosocial approach to migraine management needs to reflect these complex relationships.

Treating migraine via a single approach, such as pharmacology, can prove beneficial for some, but not for all. Ideally a service should be able to accommodate and adapt to the complexities intrinsic to both the condition and the individual patient.

Most individuals with a migraine related disorder do not have the ‘means’ to effectively manage their headache. Increasing the effectiveness of all treatment modalities can be improved if individuals are empowered to manage their symptoms. Psychological techniques can help with this. Factors such as work stress, home stress, relationship difficulties, anxiety, depression and other issues can trigger headaches, maintain them, exacerbate their presentation or add to the disruption of overall functioning above and beyond that experienced from headaches alone. Psychological and behavioural factors might not necessarily play a causal role per se; but instead contribute to headache chronicity.

The bio-psychosocial model is recognizable in most aspects of health. In the field of pain management this has been one driving force underpinning the delivery of services. It is not unreasonable to extrapolate that management of chronic headache would also benefit from such an approach. However, much of the adult pain literature omits headache, although paediatric literature does tend to include headache presentations.

Psychological and psychiatric comorbidity in chronic migraine

Psychological or even psychiatric disorders frequently co-exist with chronic migraine.

There is a high prevalence of somatic symptoms and depression in patients with disabling chronic headache. Chronic headache
Outcomes included reduced headache severity, and reduced cognitive behavioural therapy significantly improved of patients. In patients with high analgesic intake, education catastrophising. Cognitive techniques have been found to be effective in reducing comparison to other treatment options. It is important to note that the gains from behavioural approaches as potentially synergistic. Support for this view comes from a study of 232 individuals through which better outcomes were achieved with a combined pharmacological and behavioural approach. Arguably, therefore, a gold standard approach would be to include psychological input and/or coping strategies. Other techniques allow wider application. Various methods have been adopted. Group therapy has been shown to be as efficacious as individual treatment. In other studies psychological intervention even with minimal therapist contact was reported to be as effective as standard psychological interventions and the use of patient experts has also been explored. Internet based behavioural regimes have led to significantly greater decreases in headache activity, though with relatively large ‘drop out’ rates. They do largely appear acceptable to patients.

Conclusions
It is clear that migraine is a ‘biological’ and not a ‘psychological’ entity. However cognitive and emotional activity, such as hyper vigilance to potential pain and fear of re-injury, can amplify pain perception, while psychological factors associated with poor treatment response may include high depression scores.
catastrophising and poor coping strategies. Functional imaging indicates that cognition and pain experience may change the way the brain processes pain inputs. This may provide a physiological rationale for the behavioural/psychological aspects of migraine. It would thus appear logical to view medical and psychological approaches as potentially synergistic rather than mutually exclusive.

Psychological factors can be involved in migraine in 4 different ways. These can inform treatment approaches.

- Stress can be a trigger for migraines. There is evidence that different approaches to coping with stress can reduce the impact of this factor.
- Having severe migraine can itself be a cause of significant stress. This can, in turn, make the migraines worse.
- The use of psychological techniques can help people cope with their pain more effectively.
- Longitudinal data demonstrate a complex bidirectional association between mood disorders and migraine. For some patients this can be a significant issue.

Most studies of psychological management of migraine have been relatively small and the approach often varies between clinicians. Thus, definitive evidence of efficacy is not always easy to demonstrate. The optimum method of delivery and the length of intervention are uncertain. While psychological therapies may be delivered on a one to one basis, when considering such a common problem as headache, an individual approach has practical limitations. Some studies have shown group therapy to be as efficacious as individual therapy and the length of intervention are uncertain. While not always easy to demonstrate. The optimum method of delivery and the length of intervention are uncertain. While psychological therapies may be delivered on a one to one basis, when considering such a common problem as headache, an individual approach has practical limitations. Some studies have shown group therapy to be as efficacious as individual treatment, while the use of internet based behavioural regimes or patient experts have been advocated by others.

References

1. Masek BJ. Commentary: The pediatric migraine connection. J Pediatr Psychol 1999;24:110.
2. Ramadan NM, Schultz LL, Gilkey SJ. Migraine prophylactic drugs: Proof of efficacy, utilization and cost. Cephalalgia 1997;17:73-80.
3. Rothrock JF. Treatment of acute migraine with intravenous droperidol, headache. Headache 1997;37:256-7.
4. NICE SCOPE. NICE Clinical Guideline- Headaches: Diagnosis and management of headaches in young people and adults. 2010. Available from: http://guidance.nice.org.uk/CG/Wave23/2 [Last accessed on 23.11.11].
5. Steiner TJ, Scher AI, Stewart WF, Kolodner K, Libermann J, Lipton RB. The prevalence and disability burden of adult migraine in England and their relationships to age, gender and ethnicity. Cephalalgia 2003;23:519-27.
6. Terwindt G, Ferrari M, Tijhus M, Groenen S, Picavet H, Launer L. The impact of migraine on quality of life in the general population - The GEM Study. Neurology 2000;55:624-9.
7. Forward SP, McGrath PJ, McKinnon D, Brown T, Swann J, Currey EL. Medication patterns of recurrent headache sufferers: A community study. Cephalalgia 1998;18:146-51.
8. Sender J, Bradford S, Watson D, Lipscombe S, Reece T. Setting up a specialist headache clinic in primary care: General practitioners with a special interest in headache. Headache Care 2004;1:165-71.
9. Melzack R, Wall PD. Pain mechanisms: A new theory. Science 1965;150:971-9.
10. Breslau N, Davis GC, Schultz LR, Peterson EL. Migraine and major depression: A longitudinal study. Headache 1994;34:387-93.
11. Breslau N, Merikangas K, Bowden CL. Comorbidity of migraine and major affective disorders. Neurology 1994;44 (Suppl.7):S17-22.
12. Blanchard EB, Andrasik F. Management of chronic headaches – a psychological approach. New York: Pergamon Press; 1985.
13. Eccleston C, Palermo TM, Williams AC, Lewandowski A, Morley S. Cochrane review for paediatric headache: Psychological therapies for the management of chronic and recurrent pain in children and adolescents. Cochrane Database Syst Rev 2009;15:CD003968.
14. May A, Matharu M. New insights into migraine: Application of functional and structural imaging. Curr Opin Neurol 2007;20:306-9.
15. May A, Ashburner J, Büchel C, McGonigle DJ, Friston KJ, Frackowiak RS, et al. Correlation between structural and functional changes in brain in an idiopathic headache syndrome. Nat Med 1999;5:836-8.
16. May A, Bahr A, Büchel C, Frackowiak RS, Goadsby PJ. Hypothalamic activation in cluster headache attacks. Lancet 1998;352:275-8.
17. Sprenger T, Goadsby PJ. What has functional neuroimaging done for primary headache and for the clinical neurologist? J Clin Neurosci 2010;17:547-53.
18. Ploghaus A, Tracey I, Gati JS, Clare S, Menon RS, Matthews PM, et al. Dissociating pain from its anticipation in the human brain. Science 1999;284:179-81.
19. Bantick SJ, Wade GW, Ploghaus A, Clare S, Smith SM, Tracey I. Imaging how attention modulates pain in humans using functional MRI. Brain 2002;125:310-9.
20. deCharms RC, Maeda F, Glover GH, Ludlow D, Pauly JM, Soneji D, et al. Control over brain activation and pain learned by using real-time functional MRI. Proc Natl Acad Sci U S A 2005;102:18626-31.
21. Ochsner KN, Bunge SA, Gross JJ, Gabrieli JD. Rethinking feelings: An fMRI Study of the cognitive regulation of emotion. J Cogn Neurosci 2002;14:1215-29.
22. Rich S, Pine D, Ernst M, Cameron J, Luckenbaugh D, Zamenk, et al. Predicting Cognitive-Behavioural Therapy outcomes for paediatric anxiety disorders using fMRI. Presented at Society for Neuroscience, San Diego, USA: Available from: http://www.abstractsonline.com/Plan/ViewAbstract.aspx?sKey=cc5b361-ebedd-4598-8b0a-b24769268c4d&cKey=d600c28f-2b6c-40a9-a62e-f0c7b82427e3&mKey=%7B6E5D5C8F‑CE2D‑D719D6‑FC7231E090FB7D%7D. [Last cited in 2010].
23. Engel George L. The need for a new medical model: A challenge for biomedicine. Science 1977;196:129‑36. ISSN 0036-8075.
24. Turk DC, Burwickle TM. Coping with chronic pain. In the Handbook of Clinical Psychology. Carr, McNulty, editors. London: Routledge; 2006. ISBN 13 978‑1‑58391‑854‑8.
25. Adelma J. Migraine headaches: Implications for management in women with disabling chronic headache. Neurology 2007;68:134-40.
26. Lantéri-Minet M, Massiou H, Nachit-Ouinekh F, Lucas C, Pradailier A, Radat F, et al. The GRIM2005 study of migraine consultation in France I. Determinants of consultation for migraine headache in France. Cephalalgia 2007;27:1386-97.
27. Lucas C, Lantéri-Minet M, Massiou F, Nachit-Ouinekh F, Pradailier A, Mercier F, et al. The GRIM2005 study of migraine consultation in France II. Psychological factors associated with treatment response to acute headache therapy and satisfaction in migraine. Cephalalgia 2007;27:1398-407.
28. Campbell JK, Penzien DB, Wall EM. Evidence based guidelines for migraine headaches: Behavioral and physical treatments. U.
29. Campbell JK, Penzien DB, Wall EM. Evidence based guidelines for migraine headaches: Behavioral and physical treatments. U.
30. Edmeads J, Findlay H, Tugwell P, Pryse-Phillips W, Nelson RF, Murray TJ. Impact of migraine and tension type headache on quality of life: a nationwide patient survey. Headache Quarterly 2000;11;105‑12.
31. Tietjen GE, Brandes JL, Digre KB, Baggaley S, Martin V, Recober A, et al. High prevalence of somatic symptoms and depression in women with disabling chronic headache. Neurology 2007;68:134-40.
32. McCrory D, Penzien D, Hasselbald V, Gray R. Behavioural and...
physical treatments for tension-type and cervicogenic headache. In Holroyd KA. Assessment and Psychological Management of Recurrent Headache Disorders. J Consult Clin Psychol 2002;70:656-77.

33. Trautmann E, Lackschewitz H, Kröner-Herwig B. Psychological treatment of recurrent headache in children and adolescents – a meta-analysis. Cephalalgia 2006;26:1411-26.

34. Martin PR, Forsyth MR, Reece J. Cognitive Behavioural Therapy versus temporal pulse amplitude biofeedback. Behav Ther 2007; 38:350-63.

35. Fritsche G, Frettloh J, Huppe M, Dlugaj M, Matako N, Gaul C, et al. Prevention of medication overuse in patients with migraine. Pain 2010;151:404-13.

36. Nicholson RA, Buse DC, Andrasik F, Lipton RB. Nonpharmacologic treatments for migraine and tension-type headache: How to choose and when to use. Curr Treat Options Neurol 2011; 13:28-40.

37. Holroyd KA, Cottrell CK, O'Donnell FJ, Cordingley GE, Drew JB, Carlson BW, et al. Effect of preventative (beta blocker) treatment, behavioural migraine management, or their combination on outcomes of optimised acute treatment in frequent migraine: randomised controlled trial. BMJ 2010;341:c4871.

38. Andrasik F, Walch SE. Chapter 11 Headaches from handbook of applied psychology. 2nd ed. Wiley-Blackwell; 2007. ISBN-10: 0470015349.

39. Rothrock JF, Parada VA, Sims C, Key K, Walters NS, Zweifler RM. The impact of intensive patient education on clinical outcome in a clinic-based migraine population. Headache 2006; 46:726-31.

40. Holroyd KA. Assessment and psychological management of recurrent headache disorders. J Consult Clin Psychol 2002;70:656-77.

41. Nash JM. Psychological and behavioural management of tension-type headache: Treatment procedures. Curr Pain Headache Rep 2003;7:475-81.

42. Mathew NT. Chronic refractory headache. Neurology 1993: 43 (suppl 3):S26-33.

43. Holroyd KA, Malinoski P, Davis MK, Lipchik GL. The three dimensions of headache impact: Pain, disability and affective distress. Pain 1999; 83:571-8.

44. NICE Depression: Treatment and management of depression in adults, including adults with a chronic physical health problem. Available from: http://www.nice.org.uk/CG91. [Last cited in 2009].

45. NICE Generalised Anxiety Disorder and Panic Disorder (without or without Agoraphobia) in adults. Management in Primary, Secondary and Community Care. Available from: http://guidance.nice.org.uk/CG113. [Last cited in 2011].

46. Lipchik GL, Nash JM. Cognitive-Behavioral issues in the treatment and management of chronic daily headache. Curr Pain Headache Rep 2002;6:473-9.

47. Seng EK, Holroyd KA. Dynamics of changes in self-efficacy and locus of control expectancies in the behavioral and drug treatment of severe migraine. Ann Behav Med 2010; 40:235-47.

48. Johnson PR, Thorn BE. Cognitive Behavioral treatment of chronic headache: Group versus individual treatment format. Headache 1989; 29:358-65.

49. Nash JM, Park ER, Walker BB, Gordon N, Nicholson RA. Cognitive-Behavioural group treatment for disabling headache. Pain Med 2004;5:178-86.

50. Richardson GM, McGrath PJ. Cognitive-Behavioural Therapy for migraine headaches: A minimal-therapist-contact approach versus a clinic-based approach. Headache 1989;29:352-7.

51. Mérelle SY, Sorbi MJ, van Doornen LJ, Passchier J. Migraine patients as trainers of their fellow patients in non-pharmacological preventive attack management: Short-term effects of a randomized controlled trial. Cephalalgia 2008;28;127-38.

52. Devineni T, Blanchard EB. A randomized controlled trial of an internet-based treatment for chronic headache. Behav Res Ther 2005;43:277-92.

53. Sorbi MJ, van der Vaart R. User acceptance of an Internet training aid for migraine self-management. J Telemed Telecare 2010;16:20-4.

54. Strom L, Petterson R, Anderson G. A controlled trial of self help treatment of recurrent headache conducted via the internet. J Consult Clin Psychol 2000;68:722-7.