

An overview of mindfulness-based interventions and their evidence base

Mental Health Foundation of New Zealand 2011

What is mindfulness?

Mindfulness is a mode of attention characterised by openness, acceptance and an enhanced ability to respond to the present moment. Being mindful allows for a clearer understanding of how thoughts and emotions impact on our health and quality of life. Mindfulness practices enable us to recognise and overcome the many ways that we tend to get caught in rumination, distraction and resistance. They reveal the inherent ability of the mind and body to rebalance and sustain wellbeing, and help us to discover positive new perspectives, behaviours and solutions.

The most frequently quoted definitions of mindfulness in the mindfulness-based intervention (MBI) literature come from Jon Kabat-Zinn:

... paying attention in a particular way: on purpose, in the present moment, and non-judgmentally. (Jon Kabat-Zinn, 1995)

Mindfulness meditation is a consciousness discipline revolving around a particular way of paying attention in one's life. It can be most simply described as the intentional cultivation of nonjudgmental moment-to-moment awareness. (Jon Kabat-Zinn, 1996)

Mindfulness has its roots in the ancient practice of meditation. In the last 20 years, it has become a discrete term within academic medicine and psychology. It was initially popularised by Kabat-Zinn who, in 1979, developed a successful mindfulness-based stress reduction programme at the University of Massachusetts Medical Centre. In 1995, he went on to found The Center for Mindfulness in Medicine, Health Care, and Society, which describes itself as:

... a visionary force and global leader in mind-body medicine. For thirty years, we have pioneered the integration of mindfulness meditation and other mindfulness-based approaches in mainstream medicine and healthcare through patient care, research, academic medical and professional education, and into the broader society through diverse outreach and public service initiatives.

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The applications and uses of MBIs in medicine and mental healthcare are now rapidly expanding, and their benefits are supported by a growing empirical evidence base.

How does mindfulness work?

Bishop et al. (2004) initially proposed a two-part operational definition of mindfulness:

The first component involves the self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment. The second component involves adopting a particular orientation toward one's experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance.

A further model, developed by Shapiro, Carlson, Astin & Freedman (2006), presents three core axioms: intention, attention and attitude. Intention signifies the practitioner's personal vision, which shifts along a continuum 'from self-regulation, to self-exploration, and finally to self-liberation'; attention means developing the competencies of applied and sustained focus, and flexibility of focus; and attitude is an accepting, open and kind curiosity towards one's own experience. In the learning process, these internal behaviours are engaged to attend to the mind and body as it presents itself in the here and now, without habitual judgments and interpretations. This produces a shift in perspective called *reperceiving*, through which one gains an increased capacity for objectivity about one's own internal experience. This, in turn, increases self-regulation and self-management, creativity, and cognitive, emotional and behavioural flexibility. In scientific accounts across the different discourses of meditation and mindfulness, the shift has also been described as a 'de-automatisation of the psychological structures that organise, limit, select and interpret psychological stimuli' (Deikman, 1966); 'decentering' – the capacity to view experience from 'outside' (Safran & Segal 1990); and in traditional Buddhist meditation, the position of the 'silent witness'.

This shift is widely regarded as a central mechanism in MBIs. This enlargement of awareness is not the same as dissociation or disconnection, but rather a functional development that enables the practitioner to transform previously rigid cognitive and emotional styles. Shapiro et al. (2006) identified further outcomes of *reperceiving*: values clarification, which provides an opportunity to choose new and more congruent values; and exposure, where previously difficult thoughts and emotions can be encountered so as to reduce their capacity for disruption.

Relevant to the understanding of how mindfulness works is recent research on the neuroscience of positive human qualities and how they can be cultivated through contemplative practice. The neuroscientist Richard Davidson's dialogues with the Dalai Lama through the Mind and Life Institute (www.mindandlife.org) and subsequent studies on meditating monks have generated empirical support for the concept of neuroplasticity. This recognises that the brain, more than any other organ in our body, is built to grow and change in response to experience, and that intentional deployment of mental strategies can induce plastic changes in the brain that endure and have positive consequences for health. These ideas are also driven by developments in the related field of epigenetics, which states that genes are regulated by the environment in which they reside, and that the genes which are expressed in our brains are also influenced by our mental environment. Davidson (2009) refers to 'neurally inspired behavioural interventions' – i.e. behavioural or mental interventions (such as mindfulness) – as being the most effective way to produce localised and specific biological changes in the brain. Therefore, as for any skill, positive emotions, such as happiness, require practice and time – but it is possible to train a mind to be happy.

The most influential MBIs

Mindfulness-Based Stress Reduction (MBSR)

Mindfulness-Based Stress Reduction (MBSR) was the first mindfulness programme to be developed within a healthcare setting. Since its inception in 1979, the Centre for Mindfulness in Healthcare, Medicine and Society at the University of Massachusetts Medical School reports that more than 18,000 people have completed their 8-week course, which is delivered in a class format so that participants can share and learn from their collective experience. It is both educational and experiential, incorporating traditional Buddhist mindfulness meditation techniques (moving from a focus on the breathing to an expanded awareness of other objects of attention, e.g. thoughts, sensations and feelings), gentle yoga and stretching, exercises such as the 'body scan', in which participants bring mindful awareness to different areas of their body, and journal tasks in order to incorporate mindfulness into daily life.

The programme's original purpose was to discover whether mindfulness and relaxation exercises could help people with chronic health problems such as high blood pressure, chronic pain and anxiety disorders. As an evidence-based treatment, it has created appeal at the academic and research level, as well as to public sector funding sources. The model has now been adopted by service providers worldwide, with hundreds of MBSR clinics and free-standing programmes attracting tens of thousands of people on five continents. MBSR programmes are currently run in a number of locations in New Zealand, with at least one funded by a Primary Health Organisation.

The MBSR curriculum and approach to teaching mindfulness has become a framework on which many other initiatives have been built. Some examples of these are Mindfulness-Based Relationship Enhancement (MBRE), which teaches interpersonal practices for couples (Carson, Gill & Baucom, 2004); Mindfulness-Based Eating Awareness Training (MB-EAT) – a specific intervention for binge-eating disorder (Kristeller, Baer, & Quillian-Wolever, 2006); Mindfulness-Based Art Therapy (MBAT) (Monti et al., 2006); and Mindfulness Based Childbirth and Parenting (MBCP), which teaches couples to deal with concerns about an upcoming birth, and trains them in wise attention, which will form the basis of a good attachment relationship with the newborn child. Here in New Zealand, a Kaupapa Māori MBSR programme is being developed by Dr David Tipane-Leach, which is a customised MBSR programme within a kaupapa Māori environment that will include karakia, traditional parables and wisdom.

Mindfulness-Based Cognitive Therapy (MBCT)

Mindfulness-Based Cognitive Therapy (MBCT) is based on the MBSR group-based, 8-week programme, but was specifically adapted by Zindel Segal, Mark Williams and John Teasdale in 2000 for use by people who had suffered repeated bouts of depression in their lives. It blends features of cognitive therapy with mindfulness practices. However, unlike cognitive therapy, MBCT involves accepting thoughts and feelings without judgment, rather than making any effort to evaluate or change their content. This way of considering the mind as a place of 'being' rather than 'doing' lessens rumination and enables people prone to depression to forestall approaching relapse. In their book *Mindfulness Based Cognitive Therapy*, Segal, Teasdale and Williams (2002) stated that:

'The ultimate aim of the MBCT programme is to help individuals make a radical shift in their relationship to the thoughts, feelings and bodily sensations that contribute to depressive relapse' It also aims to 'help participants choose the most skillful response to any unpleasant thoughts, feelings or situations they meet'.

The United Kingdom National Institute of Clinical Excellence (NICE) has recently endorsed MBCT as an effective treatment for prevention of relapse. Research has shown that people who have been clinically depressed three or more times (sometimes for 20 years or more) find that taking the programme and learning these skills helps to considerably reduce the chances that depression will return (National Collaborating Centre for Mental Health, 2009).

Dialectical Behaviour Therapy (DBT)

Dialectical behavior therapy (DBT), which was developed by Marsha Linehan, is a cognitive behavioural and mindfulness-based therapy for borderline personality disorder (BPD). The main dialectic is between the opposing forces of change and acceptance, i.e. accepting the ways things are while simultaneously working to improve them. Mindfulness is taught as a set of skills through structured exercises. These include observing, describing and participating in one's present moment experience in a non-judgmental, one-thing-at-a-time and effective manner. DBT teaches how to make use of the 'wise mind' – the inherent ability to be clearly aware of thoughts and feelings. It was the first psychotherapy shown to be effective in treating BPD in controlled clinical trials, and it now has a large and strong evidence base, being considered one of the best treatments for BPD in terms of documented success rates.

Acceptance and Commitment Therapy (ACT)

Acceptance and Commitment Therapy (ACT) is an empirically based psychological intervention that uses acceptance and mindfulness strategies, together with commitment and behaviour change strategies, to increase psychological flexibility. Psychological flexibility means fully connecting with the present moment as a conscious human being and, based on what the situation affords, changing or persisting in behaviour depending on the individual's chosen values. Although it draws strongly on a cognitive behavioural framework, ACT differs in its predominant use of mindfulness exercises in individual therapy to assist people towards flexibility.

ACT has, as of October 2006, been evaluated in over 30 randomised clinical trials for a variety of client problems. Overall, when compared to other active treatments designed or known to be helpful, the effect size for ACT is a 'Cohen's d' (the difference between two means divided by a standard deviation for the data) of around 0.6, which is considered a medium effect size. ACT is considered an empirically validated treatment for depression by some organisations, such as the American Psychological Association, by whom it is listed as an empirically supported treatment with 'modest research support' status.

Research

Although there is still much to learn about mindfulness, the current body of scientific literature on its effects is promising. The growing evidence base indicates that repeated mindfulness practice can lead to positive life changes, including reduced stress and anxiety, reduced chronic physical pain, a boosted immune system, the ability to cope with difficult life events such as change or the death of a loved one, the ability to deal with negative emotions, reduced insomnia, increased self-awareness to detect harmful reactive patterns of thought, feeling and action, improved concentration, a greater sense of happiness and wellbeing, and reduced addictive behaviours. It can result in positive change in the structure of the brain and even have a positive effect on physical problems such as hypertension and heart disease. On its current website under 'Major Research Findings', the Center for Mindfulness in Medicine, Health Care, and Society, at Umass stated:

Our work over the past twenty-eight years has shown consistent, reliable, and reproducible demonstrations of major and clinically relevant reductions in medical and psychological symptoms across a wide range of medical diagnoses, including many different chronic pain conditions [Kabat-Zinn, 1982; Kabat-Zinn, Lipworth and Burney, 1985; Kabat-Zinn et al, 1986], other medical diagnoses [Kabat-Zinn and Chapman-Waldrop, 1988]; and in medical patients with a secondary diagnosis of anxiety and/or panic [Kabat-Zinn et al, 1992; Miller et al, 1995], over the eight weeks of the MBSR intervention, and maintenance of these changes in some cases for up to four years of follow-up.

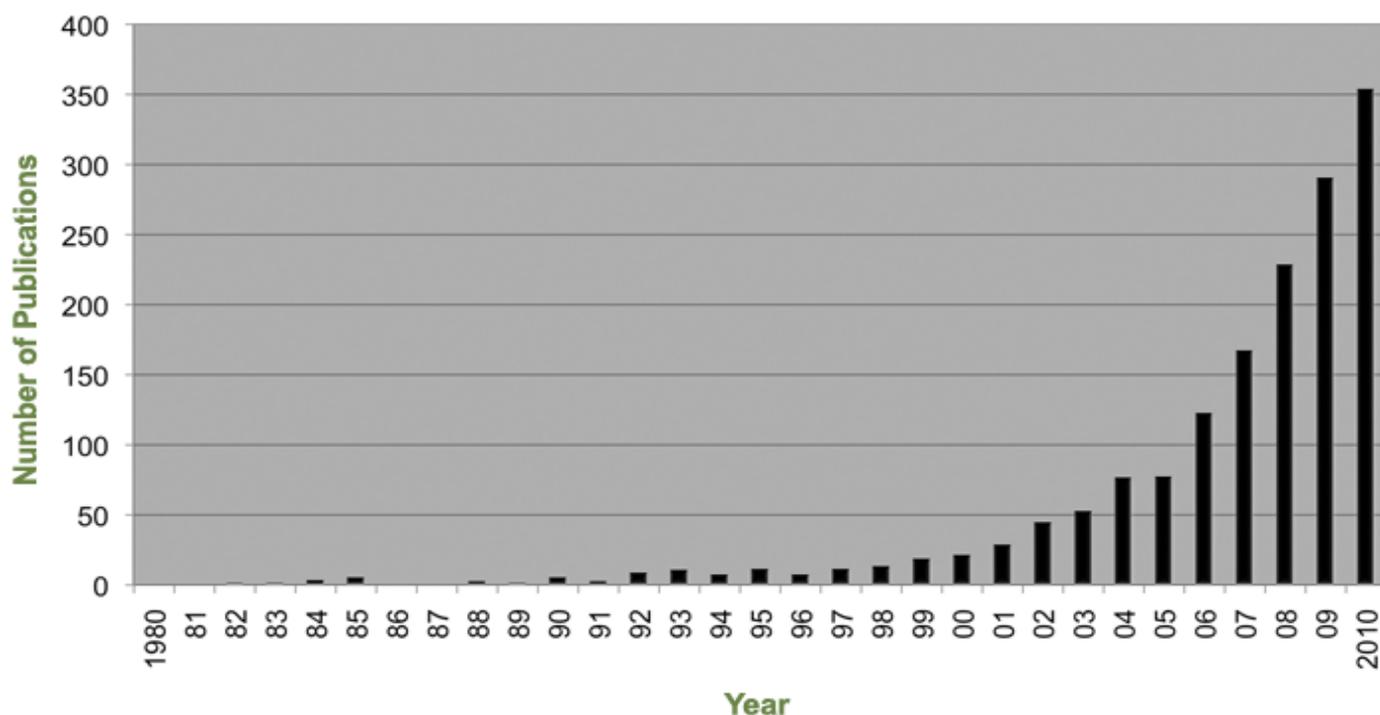
We have also seen consistent, reliable, and reproducible demonstrations of significant and clinically relevant increases in trait measures which are usually stable in adulthood, indicative of enhanced psychological hardiness (Kobasa) and greater sense of coherence (Antonovsky) over the course of the eight week intervention, and maintenance of these gains for up to three years of follow-up. The latter measures indicate a heightened sense of self and self-in-representation, and a greater ability to find coherence and act effectively under high degrees of stress. These changes enhance the experience of self-efficacy in patients and their view of the value of engaging in their own on-going health and wellbeing through meditation, yoga, and above all, the systematic cultivation of awareness [Kabat-Zinn, Skillings, and Salmon, manuscript submitted].

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Reflecting on the growth and influence of MBIs and how they have been the focus of outcome studies with specific medical or psychiatric conditions and populations, McCown, Reibel and Micozzi (2010) in *Teaching Mindfulness* say:

Although early (mindfulness) studies often lacked methodological rigour, as interest and evidence has mounted, resources and funding have become available for randomised, controlled clinical trials, which have continued to provide support for the efficacy of MBSR and other mindfulness-based and informed interventions. As we are writing this, clinical trials have been funded or are underway to study the efficacy of MBI's in asthma, bone marrow transplant, breast cancer, chronic pain, chronic obstructive pulmonary disease, fibromyalgia, HIV/AIDS, hot flashes, hypertension, immune response to human papillomavirus, irritable bowel syndrome, lupus, myocardial ischemia, obesity, prostate cancer, rheumatoid arthritis, solid organ transplant, type 2 diabetes ... as well as psychiatric disorders including anxiety disorders, delusional disorder, depression, drug abuse and dependence, eating disorders, personality disorders, PTSD, schizophrenia, suicidality, and others.

The following chart demonstrates the increase in the amount of mindfulness research literature over the 30 years between 1980 and 2010:



These results were obtained by searching for the term 'mindfulness' in the abstract and keywords of the ISI Web of Knowledge database on 5 Feb 2011. The search was limited to publications with English language abstracts. The figures at time of writing predict an annual total of at least 450 publications.

A comprehensive electronic resource and publication database, the *Mindfulness Research Guide* (www.mindfulexperience.org/), has been established to provide information on the scientific study of mindfulness to researchers, practitioners and the general public. This includes:

- A database of research publications in the area of mindfulness
- Measurement tools to operationalise mindfulness
- A list of interventions incorporating mindfulness techniques
- The names of universities and centres conducting mindfulness research

It also hosts the *Mindfulness Research Monthly* bulletin, which aims to keep researchers and practitioners informed of current advances in mindfulness research.

Two meta-analyses on mindfulness have been conducted to date, both of which had strict criteria for the selection of studies for inclusion. The results of each are relevant across a broad range of population types, ages and social groups.

Baer (2003) concluded that MBI approaches yield ‘at least medium sized effects, with some effect sizes falling within the large range’.

Variable	N ^a	Mean effect size ^b
<i>By research design</i>		
Pre-post	8	0.71
Between group	10	0.69
<i>By Population</i>		
Chronic pain	4	0.37
Axis 1 (anxiety, depression)	4	0.96
Medical (fibromyalgia, cancer, psoriasis)	4	0.55
Nonclinical (medical students, healthy volunteers)	4	0.92
<i>By outcome measure</i>		
Pain	17	0.31
Anxiety	8	0.70
Depression	5	0.86
Medical symptoms (self-report)	11	0.44
Global psychological ^c	18	0.64
Medical symptoms (objective) ^d	2	0.80

^a Number of studies included in the meta-analysis. Of the studies included in the analysis, two employed MBCT as the intervention, one employed listening to mindfulness tapes, and the remaining used MBSR as the treatment intervention.

^b Post-treatment.

^c POMS – total mood disturbance; SCL-90 global severity index.

^d Urine and skin.

Grossman, Niemann, Schmidt and Walach (2004) concluded that ‘Thus far, the literature seems to clearly slant toward support for basic hypotheses concerning the effects of mindfulness on mental and physical well-being’.

Variable	N^a	Mean effect size^b
<i>Mental health variables</i>		
Pre-post	18	0.50
Between groups	10	0.54
<i>Physical health variables</i>		
Pre-post	9	0.42
Between groups	5	0.53

^a Number of studies included in the meta-analysis. Between Groups (controlled studies) included both wait list controls (WLC) and active controls (AC). No difference in mean effect size was noted between WLC and AC.

^b Post-treatment.

Although the literature on MBIs is growing rapidly, the assessment of mindfulness has received much less attention. However, in 2003, a series of psychometric development studies provided the first valid and reliable measure of dispositional mindfulness, known as the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). This is a 15-item instrument measuring attention to and awareness of present moment experience in daily life. Respondents rate how often they experience acting on automatic pilot, being preoccupied and not paying attention to the present moment. Other mindfulness inventories or scales have also arisen, the most prominent of which include:

- The Freiburg Mindfulness Inventory
- The Kentucky Inventory of Mindfulness Skills
- The Cognitive and Affective Mindfulness Scale

These scales allow us to evaluate how well participants acquire mindfulness skills as a result of engaging with any of the MBIs. They demonstrate self-reported changes in levels of mindfulness and measure mindfulness as a dispositional characteristic (a long-lasting trait), an outcome resulting from mindfulness training and as a practice.

Some examples

Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy

Teasdale, J.D., Segal, Z.V., Williams, J.M.G., Ridgeway, V.A., Soulsby, J.M., & Lau, M.A. (2000). *Journal of Consulting and Clinical Psychology*, 68(4), 615–623.

This study evaluated mindfulness-based cognitive therapy (MBCT), designed to train recovered recurrently depressed patients to disengage from dysphoria-activated depressogenic thinking that might mediate relapse/recurrence. At three treatment sites, 145 patients who, at the time of the baseline assessment, were in remission or recovery from major depression were randomised to continue with treatment as usual (TAU) or to receive MBCT training in addition to their usual treatment. Following an initial treatment phase, patients entered a 1-year follow-up phase; a period of 1 year was selected because this time period has been used in previous studies (e.g. Simons et al., 1986) and it was not considered appropriate to defer the possibility for patients allocated to TAU to participate in the MBCT programme for a longer time (all of the patients initially allocated to TAU were offered the possibility of MBCT on completion of the follow-up year). Thus, the total 60-week study period comprised an initial 8-week treatment phase followed by a 52-week follow-up phase.

The researchers concluded:

For patients with recurrent major depression who had experienced three or more previous episodes, (but not in patients with only two previous episodes) MBCT approximately halved rates of relapse and recurrence over the follow-up period compared with patients who continued with TAU. This prophylactic effect could not be accounted for in terms of patients who received MBCT being more likely to use antidepressant medication. The preventative effect of MBCT was achieved for an average investment of less than 5 hr of instructor time per patient, suggesting that offering a group skills-based training program to recovered depressed patients may be a cost-efficient strategy for prevention ... To our knowledge, the results of the present trial provide the first demonstration that a group-based psychological intervention, initially administered in the recovered state, can significantly reduce risk of future relapse/recurrence in patients with recurrent major depression.

Alterations in brain and immune function produced by mindfulness meditation

Davidson, R.J., Kabut-Zinn, J., Schumaker, J., Rosenkranz, M., Muller, D., Santorelli, S., ... & Sheridan, J.F. (2003). *Psychosomatic Medicine*, 65, 564–570.

In this controlled study of an 8-week MBSR programme using a waiting list control group, it was predicted that subjects who received the training would show reduced trait anxiety, increased positive emotions and stronger immune functioning. This was measured post programme using an anxiety questionnaire, by recording brain activation in the left prefrontal cortex, which would reflect positive feelings such as happiness, and by giving subjects an influenza vaccination and measuring antibody response. Results showed that subjects

completing the programme reported less anxiety on a day-to-day basis and their brain activity showed significantly greater left-sided activation, both at the end of the course and 4 months later. At the same time, their immune systems showed a significantly greater increase in the vigour of response to the flu vaccine than the control subjects, suggesting that longer term changes in physiology may be brought about by mindfulness training along with a more positive emotional disposition.

An investigation into the health benefits of mindfulness-based stress reduction for people living with a range of chronic illnesses in Aotearoa/New Zealand

Simpson, J., Mapel, T. (in press). A final results report prepared for the Hawke's Bay Medical Research Foundation February 2010.

This study asked 'Is Mindfulness-based Stress Reduction (MBSR) training and practice effective (compared with waitlist controls) in reducing physical signs and symptoms and psychological distress associated with chronic health problems in a New Zealand/Aotearoa study sample?' Four primary research aims were designed to evaluate the effectiveness of MBSR training in a New Zealand/Aotearoa population in: 1) reducing physical signs and symptoms; 2) producing positive change in relevant medical markers of disease; 3) increasing coping ability; and 4) decreasing psychological difficulties (e.g. depression, anxiety) associated with chronic illness. Twenty-nine participants completed the study. Their physical and psychological health and wellbeing was measured before, immediately after and 6 months after the 8-week training programme using a variety of internationally recognised screening tools. Qualitative data were gathered at the 6-month follow-up stage and underwent thematic analysis. The research team was advised by two medical consultants working at Hawke's Bay Hospital, and was supported by a wider team of academics and clerical staff from the Eastern Institute of Technology, where the research was based.

Results showed statistically significant improvements in almost all categories measured. Participants' comments suggested that there had been health and wellbeing improvements in terms of physiological, behavioural, psychological and interpersonal changes. This study replicated a previous (2007) New Zealand-based study undertaken by a team working for the Waikato District Health Board. The research results were very similar to the Waikato study, providing external validity.

The researchers concluded:

This replication study has clearly shown that MBSR training as a health care intervention has made a positive impact on the health and wellbeing of the majority of our research participants, drawn from a provincial community in New Zealand/Aotearoa. While not universal, for some these changes were profound and had meant a significant improvement in participant quality of life and ability to deal with life stressors. Overall it appears the key learning for many was they now knew their physiological symptoms were something that could be worked with and they had developed a range of tools to alleviate them or at least not compound them. This led to a calmer, more balanced approach to life that appreciated the present moment more. Participants became more aware of the importance and interconnectedness of body, mind, emotions, diet, relationships and environments. People with chronic physical health problems in New Zealand often receive sound evidence based medical treatment to help them with their symptoms and thus

improve their quality and length of life. However this study has demonstrated that motivated individuals can achieve even greater gains in their health and wellbeing, perhaps lessening their need for medical intervention, through specific education aimed at helping them cope with their health problem/s, and improving self care and self efficacy. Moreover this programme can be delivered in a financially effective group style format, with a mix of educators from different health disciplines.

MBSR is a well accepted health intervention in other English speaking countries and has a large body of international research endorsing its efficacy. With a critical mass of New Zealand health professionals now able to deliver this intervention, and our own home grown research evidence starting to accrue, MBSR offers an opportunity to improve the health and wellbeing of the ever burgeoning population of people with chronic illness in our country, and reduce associated health costs.

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