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**Mindfulness and other Buddhist-Derived Interventions in Correctional Settings:
A Systematic Review**

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Abstract

Background: Throughout the last decade, there has been a growth of interest into the rehabilitative utility of Buddhist-derived interventions (BDIs) for incarcerated populations. The purpose of this study was to systematically review the evidence for BDIs in correctional settings.

Method: *MEDLINE, Science Direct, ISI Web of Knowledge, PsychInfo, and Google Scholar* electronic databases were systematically searched. Reference lists of retrieved articles and review papers were also examined for any further studies. Controlled intervention studies of BDIs that utilised incarcerated samples were included. Jaded scoring was used to evaluate methodological quality. PRISMA (preferred reporting items for systematic reviews and meta-analysis) guidelines were followed.

Results: The initial comprehensive literature search yielded 85 papers but only eight studies met all the inclusion criteria. The eight eligible studies comprised two mindfulness studies, four vipassana meditation studies, and two studies utilizing other BDIs. Intervention participants demonstrated significant improvements across five key criminogenic variables: (i) negative affective, (ii) substance use (and related attitudes), (iii) anger and hostility, (iv) relaxation capacity, and (v) self-esteem and optimism. There were a number of major quality issues.

Conclusion: It is concluded that BDIs may be feasible and effective rehabilitative interventions for incarcerated populations. However, if the potential suitability and efficacy of BDIs for prisoner populations is to be evaluated in earnest, it is essential that methodological rigour is substantially improved. Studies that can overcome the ethical issues

relating to randomisation in correctional settings and employ robust randomised controlled trial designs are favoured.

Keywords: Incarcerated, Prison, Correctional, Mindfulness, Meditation, Buddhism

Mindfulness and other Buddhist-Derived Interventions in Correctional Settings:

A Systematic Review

Introduction

According to the Ministry of Justice (MOJ), 75% of the 840,975 proven offences committed in England and Wales in 2011 were committed by repeat offenders (MOJ, 2012a). The MOJ also reports that over two-thirds of the 102,700 adult offenders receiving custodial sentences for indictable offences in 2011 had a prior custodial sentence. Indeed, approximately 50% of incarcerated adults (in England and Wales) are proven to reoffend within 12 months of release (Prison Reform Trust; PRF, 2012). Comparative figures are also reported for America where the three-year reincarceration rate is approximately 45% (Pew Centre on the States, 2011). Reoffending is a serious problem with UK sentencing costs averaging £30,500 per custodial sentence and a further £40,000 costs per year for keeping each prisoner incarcerated (PRT, 2012). Overall, reoffending is estimated to cost the British economy between £9.5 and £13 billion per year (PRT, 2012). Excluded from this estimate are the non-quantifiable and long-term costs to victims, families (of both victims and offenders), and to society more generally.

Throughout the last two decades, 'second-wave' cognitive behavioural therapies have been at the forefront of the "*What Works*" approach to offender rehabilitation (Howells, Tennant, Day, & Elmer, 2010). Whilst exact techniques vary according to offender category (e.g. violent offending, sex offending, juvenile offending, etc.), cognitive-behavioural approaches share a common mechanism of therapising via the restructuring of maladaptive core beliefs. In effect, clients are empowered to control and modify cognitive distortions and to 'self-intervene' at the level of individual thoughts and feelings.

More recently and throughout the last decade, a credible evidence base has been established for the application of ‘third-wave’ cognitive behavioural approaches for the treatment of a broad range of psychopathologies. Rather than a deliberate attempt to control and modify individual cognitions (as per second wave approaches), third wave approaches are heavily influenced by Buddhist (and other Eastern) philosophies and operate via a mechanism of ‘bare acceptance’ and transformative present-moment awareness.

Mindfulness derives from Buddhist practice and forms the basis of a number of third wave psychotherapies. Mindfulness is described in the psychological literature as purposeful, moment-to-moment, non-judgmental awareness (Kabat-Zinn, 1990). As part of the wider increase in research assessing the psychotherapeutic utility of mindfulness, there has been a growth of investigation into the rehabilitative effects of mindfulness for incarcerated populations (Howells, et al., 2010). Examples of mindfulness-based interventions utilised in correctional settings are Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Relapse Prevention (MBRP). MBSR (Kabat-Zinn, 1990) is a group-based intervention generally delivered over an eight-week period and comprises (i) weekly sessions typically of three hours duration, (ii) guided mindfulness exercises, (iii) yoga exercises, (iv) a CD of guided meditation to facilitate self-practice, and (v) an all-day eight-hour silent retreat component. MBRP (Witkiewitz, Marlatt, & Walker, 2005) follows a similar structure but is specifically tailored for treating substance use disorders (SUDs) and integrates various cognitive-behavioural techniques designed to modify drug-related beliefs (Lee, Bowen, & An-Fu, 2010).

In conjunction with mindfulness-based approaches, in the last ten years there has also been a steady growth of research examining the rehabilitative effects of other BDIs within incarcerated populations. A Buddhist-derived technique known as Vipassana Meditation

(VM) has received significant attention in this respect. Traditionally, VM refers to a subtle form of insight-generating penetrative investigation that normally follows a period of concentrative meditation (Dalai Lama & Berzin, 1997). However, within psychological settings, VM refers to an alternative form of mindfulness practice that was formulated by Satya Narayan Goenka. Goenka's VM is typically taught as part of an intensive 10-day silent retreat program involving mindfulness of breath (Pali: *anapanasati*) and becoming aware of the impermanent (i.e., transient) nature of thoughts and feelings (Perelman, et al., 2012).

Proposals that advocate BDIs for offender rehabilitation are based on the transformative aspects of Buddhist practice that have been 'tried and tested' during the philosophy's 2,600 year history. These proposals are also grounded in findings of BDI studies (from both forensic and general population/clinical settings) whereby BDIs have been shown to modulate known criminogenic agents, such as negative affective states (Day, 2009), anger (Novaco, 2007), hostility (Perelman, et al., 2012), criminal thinking (Hawkins, 2003), and impulsivity and deficiencies in emotional regulation (Farrington, 2000).

Accordingly, BDIs are recommended for the rehabilitation of offenders based on the following theoretical rationale or empirical findings: (i) Buddhist teachings emphasise the uprooting of afflictive mental states (Sanskrit: *kleshas*) with particular emphasis on the transformation of anger (Howells, et al., 2010), (ii) Buddhist training condenses down to the practice of 'letting-go' (Khyentse, 2006), including of any maladaptive self-blame or avoidance schemas and Buddhist-based mindfulness practice leads to the dismantling of such strategies (Simpson, et al., 2007), (iii) mindfulness reduces negative affect, reduces stress and anxiety, and improves self-esteem and psychological wellbeing (e.g., Waters, et al., 2009; Samuelson, Carmody, Kabat-Zinn, & Bratt, 2007), (iv) improved self-awareness and present moment awareness are factors that reduce impulsivity (Wright, Day, & Howells, 2009), (v)

greater self-awareness also corresponds to an increased ability to label and therefore modulate affective states (Gillespie, Mitchell, Fisher, & Beech, 2012), (vi) regular practice of Buddhist forms of meditation foster inner-calm, improve sleep quality, and lead to reductions in autonomic and psychological arousal (Derezotes, 2000; Sumpter, Monk-Turner, & Turner, 2009), (vii) increased breathing awareness (a fundamental aspect of many forms of Buddhist meditation) increases prefrontal functioning and leads to increased Vagal nerve output and associated reductions in heart rate (Gillespie, et al., 2012), (viii) compassion, loving-kindness, and ethical discipline represent key building-blocks of Buddhist practice and help to foster self-acceptance, tolerance, cooperation, respect, and adaptive interpersonal skills (Dalai Lama, 2001), (ix) Buddhism teaches insight meditation techniques (Sanskrit: *vipasyana*) in order to dismantle attachment to the ego-self, and reduced 'attachment' in this respect begets reductions in avoidance, dissociation, alexithymia, and fatalistic outlook (Sahdra, Shaver, & Brown, 2010), and (x) Buddhist-based meditation improves control over mental urges and reduces substance-use (e.g., Perelman, et al., 2012).

There are numerous systematic reviews of mindfulness-based interventions for the treatment of specific psychopathologies (e.g., Fjorback, Arendt, Ørnbøl, Fink, & Walach, 2011; Chiesa, Calati, & Serretti, 2011). However, few of these integrate studies based in forensic settings. Chiesa (2010) undertook a systematic review of VM but this was not limited to forensic settings and focussed on neurobiological and clinical findings. Himmelstein (2010) conducted a review exploring the effects of meditation in correctional settings. However, Himmelstein's review was narrative and incorporated multifarious meditation techniques including non-Buddhist methods such as Transcendental Meditation. Therefore, notwithstanding the growth of interest into the potential applications of Buddhist principles within correctional settings, a robust systematic review focussing on studies of BDIs in incarcerated populations has not been undertaken to date. The purpose of this study was to conduct such a review that follows

(where applicable) the PRISMA (preferred reporting items for systematic reviews and meta-analysis) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009).

Methods

Literature Search

A comprehensive literature search using *MEDLINE*, *Science Direct*, *ISI Web of Knowledge*, *PsychInfo*, and *Google Scholar* electronic databases for papers published up to September 2012 was undertaken. Reference lists of retrieved articles and review papers were also examined for any further studies. The search criteria used were ‘meditation’ (but NOT ‘Transcendental’), OR ‘mindfulness’, OR ‘Buddhis*’, OR ‘vipassana’, in combination with (AND) ‘forensic’, OR ‘prison*’, OR ‘inmates’, OR ‘incarcerated’, OR ‘correctional’, OR ‘offend*’, OR ‘reoffend*’, OR ‘crim*’.

Selection of studies

The inclusion criteria for further analysis were that the paper published had to: (i) report an empirical intervention study of a BDI, (ii) employ an active (e.g., comparative intervention or treatment as usual) or passive (e.g., wait list) control, (iii) be written in English language, (iv) utilise an incarcerated sample, and (v) include pre- and post-intervention measures of dependent variables with adequate statistical analysis. Papers were excluded from further analysis if they: (i) did not include new data (e.g., a theoretical and/or descriptive review paper), (ii) were qualitative studies, and (iii) employed non-Buddhist forms of meditation (e.g., Transcendental Meditation).

Outcome Measures

The primary considered outcome measure was reduction in rates of reoffending (i.e., assessed via risk of reoffending, adjudication records, or records of proven convictions). Secondary considered outcomes (all assessed via self-reports) included primary criminogenic agents such as (i) negative affective states (e.g., The Profile of Mood States Questionnaire [McNair, Lorr, & Droppelman, 1992]), (ii) anger and hostility (e.g., Cook and Medley Hostility Scale [Barefoot, Dodge, Peterson, Dahlstrom, & Williams, 1989]), (iii) self-esteem and optimism (e.g., Rosenberg Self-Esteem Scale [Rosenberg, 1979]), and (iv) mindfulness and relaxation capacity (e.g., Cognitive and Affective Mindfulness Scale-revised [Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007]). Additionally, reductions in psychiatric symptoms (e.g. Brief Symptom Inventory [Derogatis & Melisaratos, 1983]), and substance dependency were considered (e.g., Daily Drug-Taking Questionnaire [Parks, 2001]).

Data Extraction and Synthesis

Abstracts were identified, retrieved, assessed, and shortlisted by one of the authors. A second author ‘audited’ the initial shortlist process for the purposes of validating the rationality of the first author’s selection criteria. The same two assessors independently undertook a full-text review of all shortlisted abstracts. The Jadad Scale (Jadad, Moore, & Carroll, 1996) was used to evaluate the methodological quality of included studies. The Jadad Scale assesses study quality based on the following criteria: (i) presence/absence of randomisation, (ii) whether randomisation was appropriate, (iii) presence/absence of double blinding, (iv) whether blinding was appropriate, and (v) presence/absence of drop-out and withdrawal data. Consistent with a method employed by Chiesa and Serretti (2011), the scale was modified to account for the difficulties of blinding participants in psychotherapy studies. The maximum score was therefore 4 with a score of less than 3 indicating a poor quality study.

Disagreements regarding study eligibility or quality were resolved via discussion between the two assessors and a 100% consensus was reached in all cases.

Data were extracted with reference to recommendations by Glass, McGaw, and Smith (1981), and all authors were involved in the data extraction process. Extracted data items included sample size, control type (e.g., wait-list, treatment-as-usual, comparative intervention), diagnosis (i.e., offender category), intervention description, outcome measures, and pre-post and follow-up findings. A meta-analysis was deemed to be inappropriate due to heterogeneity between intervention types and target outcomes, and so results are presented according to a narrative synthesis method. Finally, studies were stratified according to intervention-type: (i) mindfulness-based interventions, (ii) vipassana meditation interventions, and (iii) other BDIs.

Results

Search Results

The initial comprehensive literature search yielded a total of 85 papers. After the review of the papers' abstracts, 62 studies were found to be ineligible based on the pre-determined inclusion and/or exclusion criteria. Following a full-text review of the remaining 23 papers, eight studies met all the inclusion criteria for in-depth review and assessment. Figure 1 shows the paper selection process along with principal reasons for exclusion.

[Figure 1. Flow diagram of selection process with reasons for exclusion]

Study Characteristics

The eight papers that met all the inclusion criteria comprised two mindfulness-based intervention studies, four VM studies, and two studies utilizing other BDIs. Minimum, medium, and maximum security facilities were reflected in the included studies and prisoner sentencing profile was reasonably diverse (i.e., short-term to indeterminate sentences, violent offenders, drug-use related offenders). Two studies employed a Randomised Controlled Trial (RCT) design. Participants were all adults (predominantly male). One study was based in Taiwan with the remainder based in the US. Table 1 outlines further characteristics of the studies that met all the inclusion criteria.

[Table 1. Characteristics and quality assessment of included studies]

Mindfulness-based interventions

A small-scale RCT investigated the effects of a modified program of Mindfulness-Based Relapse Prevention (MBRP) on various substance-use concomitants in adult males serving one-year sentences (for possession or supply of illicit substances) at a correctional facility in Taiwan (Lee, et al., 2011). Prisoners (mean age 40.7 years) received MBRP (n=10) or treatment as usual (TAU; n=14). TAU was a substance abuse educational program. MBRP was delivered by clinical psychologists with two years meditation experience and comprised 10 weekly sessions each of 1.5 hours duration. The dependent variables were depression (Beck Depression Inventory-II [Walter, Meresman, Kramer, & Evans, 2003]), refusal self-efficacy (Drugs Avoidance Self-Efficacy Scale [Martin, Wilkinson, & Poulos, 1995]), and

drug-use outcome experiences (Drug-Use Identification Disorders Test Extended – DUDIT-E [Berman, Palmstierna, Källmén, & Bergman, 2007]). MBRP participants experienced significant improvements (78% increase) in negative outcome expectancies compared to controls (34% decrease) as well as significant within-group improvements in levels of depression and refusal self-efficacy.

The generalisability of findings for this Taiwan-based study (e.g., to Western correctional facilities) is likely to be limited. In fact the small sample size limits the external validity more generally. Another major limitation was that attrition rate was not reported making it difficult to gauge a measure of the overall acceptability and feasibility of the modified mindfulness program. Furthermore, the translation by one of the authors of the DUDIT-E measure (originally validated for a Western/Swedish population) into Mandarin Chinese without re-validation may have invalidated the psychometric properties of the scale.

Samuelson et al (2007) undertook a large-scale study (n=1,953 adults) of the effects of MBSR on prisoners incarcerated for drug-related convictions. A total of 113 MBSR courses (each of 12-20 participants) were delivered across six minimum and medium security correctional facilities (Massachusetts, US) between 1992 and 1996. Weekly session duration varied between 1 and 1.5 hours. In some cases two sessions per week were conducted and course length ranged between six and eight weeks. In some facilities the intervention was conducted in designated ‘quiet rooms’ but in other cases the course was delivered using open space at the end of the prison gym. Approximately 75% of participants were male and the completion rate was 69%. Wait-list controls (n~180) continued with routine as usual (RAU) involving smoking cessation training, literacy education, and exercise. Outcome measures used were hostility (Cook and Medley Hostility Scale [Barefoot, et al., 1989]), self-esteem (Rosenberg Self-Esteem Scale [Rosenberg, 1979]), and mood disturbance (Profile of Mood

States [McNair, et al. 1992]). MBSR participants showed significant improvements in hostility (8% reduction), self-esteem (5% increase), and mood disturbance (31% reduction). In all cases, women showed greater improvements than men (e.g., reduction of 39% in mood disturbance for female prisoners versus 28% for men). No significant changes were reported for the control condition. Effects of the intervention were maintained at six to eight weeks follow-up.

However, the intervention was not homogeneously delivered (e.g., due to variances in total intervention hours) across each of the 113 MBSR cycles. It is therefore difficult to make comparisons with other MBSR programs. Furthermore, participants were exclusively recruited from specialist drug rehabilitation units thus findings may not be generalisable to other offender groups. In fact, given that all the participants were substance dependent, the overall scope of the study was somewhat ambiguous because substance use-related outcomes were not even assessed. Additionally, adherence to practice data was not elicited and the inclusion/exclusion criteria were not clearly defined. Thus, it is not possible to rule out the interaction of factors such as concurrent psychotherapy and/or psychopharmacology.

Vipassana meditation interventions

Perelman et al (2012) conducted a longitudinal study of VM at a maximum security facility in Alabama (US). Prisoners (presumably all male) already signed up to receive the intervention were invited to participate in the research. Three separate VM programs were delivered between 2007 and 2008. The programs followed the standard 10-day VM 'residential' silent retreat format and were conducted inside a prison gym where prisoners ate, slept, and meditated. The VM group (n=60) and control group (n=67) were reasonably well matched on demographic characteristics. Those in the control group attended a 10-week program called Houses of Healing (HOH) that also integrated mindfulness principles. The

participants' mean age was 35.4 years and approximately 80% of them were convicted for a violent offence. Most participants were serving long-term sentences and approximately one-third had a documented medical condition such as hypertension, diabetes, or SUD. Pre, post, and follow-up (one-year) data were collected for outcomes of mindfulness (Cognitive and Affective Mindfulness Scale-revised [Feldman, et al., 2007]), mood disturbance (Profile of Mood States-Short Form [Shacham, 1983]), emotional intelligence (Trait Meta-Mood Scale [Salovey, Mayer, Goldman, Turvey, & Palfai, 1995]), prison infirmary visits, and adjudication rates. Compared to controls, VM group participants showed significant improvements (that were partially maintained at follow-up) in levels of post-intervention mindfulness (increase of 9%), emotional intelligence (2% increase), and mood disturbance (8% reduction).

Although missing data were reported (and controlled for in the data analysis), the study did not report specific drop-out rates. Thus, it is impossible to determine whether missing data corresponded to participants who had completed the intervention but were simply unavailable for post-test assessment, or to participants who dropped out prior to completion. A further limitation of the study was control intervention specificity that is limited due to the HOH intervention integrating mindfulness practice. Furthermore, fidelity of implementation was not assessed (i.e., facilitator deviations from the standard VM program) and adherence to practice data was not reported. Furthermore, approximately 23% of intervention group participants had previously completed the VM program that may have obfuscated the extent to which findings could be generalised to individuals without prior meditation experience.

Bowen et al (2006) assessed the salutary effects of VM on male (72.9%) and female (20.8%) adults (n=305) incarcerated at a minimum security facility in Seattle (US). VM participants (n=63) followed the standard 10-day VM program that was conducted in silence and in

isolation from other prisoners. A total of nine gender-segregated interventions were delivered. The control group (n=242) received TAU comprising chemical dependency treatment and substance use psychoeducation. The study suffered substantial attrition with only 29% of baseline participants (29 VM and 58 TAU) completing 3-month follow-up measures. Outcomes included alcohol use (Daily Drinking Questionnaire [Collins, Parks, & Marlatt, 1985]), drug use (Daily Drug-Taking Questionnaire [Parks, 2001]), drinking-related consequences (Short Inventory of Problems [Miller, Tonigan, & Longabaugh, 1995]), alcohol use locus of control (Drinking-Related Locus of Control Scale [Donovan & O'Leary, 1978]), psychiatric symptom severity (Brief Symptom Inventory [Derogatis & Melisaratos, 1983]), and optimism (Life Orientation Test [Scheier & Carver, 1985]). At three-month follow-up, VM participants showed significant reductions over controls in alcohol use (87% reduction), crack cocaine use (66% reduction), marijuana use (89% reduction), alcohol-related negative consequences (60% reduction), and psychiatric symptomology, as well as significant improvements in psychosocial outcomes.

Bowen, Witkiewitz, Dillworth, and Marlatt (2007) conducted a secondary data analysis (n=81) of Bowen et al's (2006) aforementioned study to examine the effects of VM on thought suppression. Data from the White Bear Suppression Inventory (Wegner & Zanakos, 1994) were included in the analysis. VM participants showed significantly greater reductions in thought suppression compared to controls which was shown to partially mediate the effects of VM on alcohol use.

Simpson et al (2007) also (re)analysed data (n=88) from Bowen et al's (2006) study to assess interactions of Post-Traumatic Stress Disorder (PTSD) symptom severity on course participation and treatment outcomes. This analysis included data from the PTSD Checklist-Civilian version (Blake, et al., 1995) that parallels DSM-IV criteria. No significant

associations were found for PTSD severity and likelihood of volunteering for VM or treatment outcomes. This suggests that prisoners with marked PTSD symptoms are unlikely to experience diminished effects or be deterred from participating in VM programs.

Bowen et al's (2006) trial and the two secondary-data studies were limited by the absence of randomisation that may have introduced selection bias. Indeed, participants self-selected to receive the program and so the generalisability of findings to non-treatment seeking populations is likely to be limited. Additionally, the three-month follow-up assessment did not provide a balanced measure of maintenance effects because it was conducted three months following release from prison rather than three months post-course completion. An additional limitation was that the analysis excluded heroin and powder cocaine use, therefore the results cannot be generalised to this key offender group. Furthermore, adherence to practice data was not elicited and fidelity of implementation was not assessed.

Other Buddhist-derived interventions

An early study by Rhead and May (1983) involved adult male prisoners (Maryland, US) serving indeterminate sentences for persistent aggravated criminal behaviour. Six participants completed the two-month meditation program, with approximately the same number of non-completers. The intervention followed Tibetan, Zen, as well as other Buddhist and non-Buddhist meditation approaches. The weekly group meditation classes involved instruction on meditation, chanting, and experience-sharing. Participants were encouraged to practice meditation and mindfulness between weekly meetings. A control group (n=5) (matched on criteria such as race, I.Q., and age) received TAU consisting of weekly individual psychotherapy and counselling sessions. Meditators showed significant improvements over controls in overall psychological distress (Symptom Check List-90 [Derogatis, Lipman, & Covi, 1973]) and psychopathological symptoms (Clinical Analysis Questionnaire [Delhee &

Cattell, 1971]). The authors reported that the high attrition rate was due, in part, to a number of participants' realising that meditation was unlikely to yield mystical experiences or be an opportunity to "get high" (p.109). Despite this, the authors reported that the six participants who completed the program indicated that they would continue with their meditation practice post-intervention.

Although meditators reported maintaining their practice between weekly sessions, data relating to duration and frequency of individual practice was not elicited. Consequently, it is not possible to determine the extent to which participants adhered to the meditation practice and therefore whether other factors may have confounded the results. For example, the design of the control intervention did not account for non-specific factors such as a group-effect or experience of a novel intervention (i.e., change of normal routine). Furthermore, in addition to the small sample-size, the study was limited more generally due to a complete lack of detail regarding the design of the intervention (e.g., total intervention hours, number of weekly sessions, etc.)

A small-scale RCT assessed the effectiveness of a seven-week long meditation program (weekly meetings of 2.5 hours duration) on reported physical and emotional symptoms in female adult detainees (Sumpter, et al., 2009). Participants were allocated to either the meditation program (n=17), or a control condition (n=16). Controls continued with RAU consisting of exercise, free-time, reading, and/or being outside. Although the meditation program was not described as 'Buddhist', and was not affiliated to any particular meditation tradition, it was included as an eligible study in this evaluation because the design of the intervention significantly resembled Buddhist-based mindfulness meditation. For instance, participants were instructed to "follow the in breath and out-breath" (including counting the breath), to practice observing and "letting go of the thoughts that come into their minds", and

engage in walking meditation in order to “find an inner calm” and “live in the present moment” (p.57). The program also included discussion on the wandering nature of the mind and experience sharing. Participants completed a modified version of Borysenko’s (1988) 23-item Medical Symptom Checklist both pre- and post-intervention. This self-report measure assessed somatic symptoms (e.g., back and joint ache, numbness, chest pain, etc.) and emotional symptoms (e.g., guilt, anger, hopelessness, sleeping difficulties, etc.). Participants also completed an open-ended questionnaire. Meditating participants demonstrated significant improvements in sleeping difficulties over controls. Qualitative feedback indicated that meditators were more able to relax, had improved their anger management skills, and experienced increased hope about the future.

Although randomisation strengthened the study design, participants were detained for a fixed 20-week term that limits the generalisability of findings to females serving longer-term sentences. Furthermore, adherence to practice data was not elicited which means the interplay of other therapeutic agents cannot be ruled out. For instance, the correctional facility required that prisoners conducted their daily routine in silence and this may have exerted a therapeutic effect. In addition, self-reports of quantitative and qualitative outcomes may have been subject to recall bias.

Discussion

A systematic evaluative review of controlled studies of BDIs in correctional settings was conducted. Intervention participants demonstrated significant improvements across five key criminogenic variables: (i) negative affect, (ii) drug-related attitudes and locus of control, (iii) anger and hostility, (iv) relaxation capacity, and (v) self-esteem and optimism.

Although findings across the eight studies evaluated indicate that BDIs have rehabilitative application in correctional settings, the quality of the studies that met the inclusion was reasonably poor. Few of the studies employed random assignment and in all cases, adherence to practice and fidelity of implementation was not assessed. Therefore, factors unrelated to participation in the BDI may have exerted a therapeutic influence and confounded the findings. Over-reliance on self-report measures was a further limitation. This is an important consideration when researching incarcerated populations as there is likely to be a pronounced risk of recall bias and/or deliberate under/over reporting (e.g., due to fear of being reprimanded by penal system authorities). Additional across-the-board quality issues were a lack of clearly described inclusion/exclusion criteria, non-justification of sample sizes, and poorly defined intervention and control conditions. Furthermore, few studies assessed actual recidivism (or risk thereof).

Taking the many limitations into account, it is noteworthy that a number of the included studies showed that BDIs were effective for treating prisoners with substance addiction issues. This finding is particularly relevant in light of the greater prevalence of substance use amongst prisoner populations compared with the general population. For instance, the Surveying Prisoner Crime Reduction longitudinal cohort survey (n=3849) reported that 81% of prisoners (sentenced in England and Wales in 2005/2006 to serve between 1-48 months in prison) reported having used drugs at some point in their lives (MOJ, 2012b). This is compared to a figure of 13% for men aged 16-59 in the general population (Fox, 2011). Coupled with improvements in concomitants such as self-efficacy and negative affective states, proposed mechanisms for the ameliorating effect of Buddhist meditation on substance addiction centre around the acceptance, non-reactive awareness, and 'unfiltered present-moment-experiencing' of mental urges (sometimes referred to as 'urge surfing'). According

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to Appel and Kim-Appel (2009), urge surfing regulates cravings for psychotropic states that are a means of ‘escaping’ from the present moment.

In addition to this more widely accepted perspective, it could be postulated that Buddhist meditation may also moderate substance use via a ‘substitution’ mechanism. For instance, Griffiths (1996) acknowledges that meditation can be ‘positively addictive’, and in one of the few empirical studies examining the adverse effects of meditation, Shapiro (1992) found that 63% of meditators (n=27) reported at least one adverse effect that in some cases included feeling addicted to meditation. Furthermore, proficiency in meditation and mindfulness practice typically requires many years (if not decades) of focussed meditation training (Khyentse, 2006). However, the duration of BDIs in the studies evaluated here ranged from just ten days to ten weeks. Moreover, SUDs are notoriously difficult to treat and typically require long-term multifaceted approaches due to being highly co-morbid with other psychopathologies (Davey, 2008). Thus, although reports of the addictive properties of meditation (whether in the positive or impairing sense) are relatively uncommon, the possibility of a substitution effect cannot be ruled out.

The evaluated studies primarily focussed on mindfulness and vipassana techniques. However, interventions that integrate the Buddhist practices of compassion and loving-kindness may also have utility in offender settings. Within Buddhism, loving-kindness and compassion represent two of the ‘four sublime attitudes’ (Sanskrit: *bhramaviharas*). As part of training in these attitudes, the practitioner enters into meditative absorption and then distributes or ‘radiates’ compassion and loving-kindness to all sentient beings (whether considered as friend or foe) in equal measure.

According to Buddhist teachings, a mind saturated with unconditional love and compassion is transformed of negative predilections and is incapable of (intentionally) causing harm.

Buddhism also asserts that this unconditional, meta-benevolent, and all-encompassing attitude radically resets maladaptive insensible core beliefs resulting in enduring psychological (and spiritual) benefit for the meditator (Dalai Lama, 2001). There is growing empirical evidence that supports the validity of such assertions. For example, in an RCT of a six-week long compassion meditation program (based on the Tibetan Buddhist ‘Mind Training’ technique), Pace et al (2009) demonstrated that meditators (healthy adults) experienced significant reductions in adverse psychosomatic responses to psychosocial stress.

Compassion and self-compassion have also been shown to reduce negative affective states within clinical and general population settings (e.g. Gilbert, 2009; Neff, Kirkpatrick, & Rude, 2007). Keysers (2011) has associated empathic arousal with mirror neuron activation (rostral section of the inferior parietal lobule) and suggests that greater empathic awareness of thoughts and feelings may activate mirror neurons leading to increased emotion regulatory capacity. Furthermore, loving-kindness meditation has been shown to reduce negative affect and lead to greater levels of implicit and explicit positivity towards strangers (Hutcherson, Seppala, & Gross, 2008). Furthermore, in a recent review of compassion and loving-kindness meditation interventions, Hofmann, Grossman, and Hinton (2011) specifically highlighted the suitability of these techniques for the treatment of anger control issues.

Factors that may impede the successful integration of BDIs into forensic settings relate to the transcultural difficulties of assimilating Eastern techniques into Western culture (Howells, et al., 2010). Of particular bearing is the competence and training of clinicians and facilitators of BDIs who may not have the experience to impart an embodied ‘authentic’ transmission of the subtler aspects of meditation practice (Shonin, Van Gordon, Sumich, Sundin, & Griffiths, 2012). A further issue is the relative reticence by Westerners to engage in introspective or contemplative practice. In this respect, VM interventions may have reduced utility compared

with other BDIs as prisoners new to meditation practice may find a ten-day silent retreat to be over-intensive. Additional integration issues relate to the therapeutic use of Buddhism in Western prisons which are mostly geared towards servicing the needs of a predominantly non-Buddhist population. For example, in a recent survey of prison chaplains spanning all 50 US states (n>1400), the Pew Forum for Religion and Public Life (2012) found that 71% of prison chaplains described themselves as Protestant, 13% as Catholic, 7% as Muslim, and 3% as Jewish ('Buddhism' did not feature as a standalone religious denomination). However, working in its favour is the fact that Buddhism is more of a philosophical system rather than a religion and does not require adherence to a set of beliefs or worship protocol. In any event, BDIs are predominantly delivered in secularised format which renders issues relating to religiosity somewhat redundant. Furthermore, qualitative studies suggest that BDIs represent acceptable interventions for prisoner populations (e.g., Ranganathan, Bohet, & Wadhwa, 2008).

Additionally, there are a number of other potentially restrictive dynamics. However, these are *de facto* applicable to all prison-based intervention studies. The transient nature of prison-life (i.e., due to transfers or parole), shortage of 'quiet space', and general security considerations are notable examples. Further constraints relate to the ethical implications of conducting RCTs within prison settings. Following release from prison, those participants allocated to non-treatment conditions may pose a risk to society due to not receiving a potentially efficacious treatment. Non-participating controls may also lack the freedom to pursue alternative treatment options (Ward & Willis, 2010). However, subject to resource and logistical constraints, the majority of these issues can be overcome by providing non-treatment controls with the option of participating in an identical intervention (not necessarily conducted under research conditions). Furthermore, ethical issues also arise if prisoners are not included in research programs where they are likely to derive benefit (Pont, 2008).

This systematic review featured a number of limitations. Only English language studies were included, which, given the popularity of Buddhism in Eastern-language countries, may have resulted in the omission of relevant empirical evidence. Furthermore, a sizeable number of unpublished manuscripts (n=23) were excluded from the review. It is possible that some of these were controlled BDI studies and thus further relevant and empirical evidence may have been disregarded. Non-methodological limitations relate to factors that restrict the generalisability of findings and include the fact that: (i) the majority of the studies were conducted in US correctional facilities, (ii) the majority of participants were males, (iii) adolescent offender and sex offender populations were not represented, (iv) prisoners from psychiatric facilities were not represented, and (v) the sample size in seven of the eight included studies was relatively small.

From this systematic evaluative review, it is concluded that BDIs may be feasible and effective rehabilitative interventions for incarcerated populations. A number of uncontrolled studies (excluded from the current review) also support this view and provide early evidence for the suitability of BDIs for offender populations with more specific criminogenic needs. For example, BDIs have been shown to improve the regulation of deviant sexual arousal (e.g., Singh, et al., 2011; Derezotes, 2000) and to be appropriate for the rehabilitation of incarcerated adolescents (e.g., Himelstein, Hastings, Shapiro, & Heery, 2012; Himelstein, 2011). Despite the inevitable complications of integrating BDIs into correctional settings (e.g., due to transcultural issues, group-size security restrictions, and/or disruptions to group-continuity, etc.), group-based BDIs are likely to represent viable *'What Works'* interventions due to their cost-effective nature (e.g., a typical eight-week BDI requires as few as 3-4 facilitator hours per prisoner). Nevertheless, if the potential suitability and efficacy of BDIs for prisoner populations is to be evaluated in earnest, it is essential that methodological rigour is improved and that prison intervention studies begin to utilize RCT designs (Waters, et al.,

2012; Seto, et al., 2007) that follow the CONSORT (consolidated standards of reporting trials) guidelines (e.g., Boutron, Altman, Schulz & Ravaud, 2008; Schulz, Altman & Moher, 2010).

References

- Appel, J., & Kim-Appel, D. (2009). Mindfulness: Implications for substance abuse and addiction. *International Journal of Mental Health Addiction*, 7, 506-512.
- Barefoot, J. C., Dodge, K. A., Peterson, B. L., Dahlstrom, W. G., & Williams, R. B. (1989). The Cook-Medley Hostility Scale: Item content and ability to predict survival. *Psychosomatic Medicine*, 51, 46-57.
- Berman, A. H., Palmstierna, T., Källmén, H., & Bergman, H. (2007). The self-report Drug Use Disorders Identification Test-Extended (DUDIT-E): Reliability, validity, and motivational index. *Journal of Substance Abuse Treatment*, 32, 357-369.
- Blake, D. D., Weathers, F. W., Nagy, L. M., Kaloupek, D. G., Gusman, F. D., Charney, D. S., & Keane, T. M. (1995). The development of a clinician administered PTSD scale. *Journal of Traumatic Stress*, 8, 75-90.
- Borysenko, J. (1988). *Minding the Body Mending the Mind*. New York: Bantam.
- Boutron, I., Altman, D. G., Schulz, K. F., & Ravaud, P. (2008). Extending the CONSORT statement to randomized trials of nonpharmacologic treatment: Explanation and elaboration. *Annals of Internal Medicine*, 148, 295-309.
- Bowen, S., Witkiewitz, K., Dillworth, T. M., & Marlatt, G. A. (2007). The role of thought suppression in the relation between mindfulness meditation and alcohol use. *Addictive Behaviours*, 32, 2324-2328.
- Bowen, S., Witkiewitz, K., Dillworth, T. M., Chawla, N., Simpson, T. L., Ostafin, B. D., . . . Marlatt, A. G. (2006). Mindfulness meditation and substance use in an incarcerated population. *Psychology of Addictive Behaviour*, 20, 243-347.

- Chiesa, A. (2010). Vipassana meditation: Systematic review of current evidence. *Journal of Alternative and Complementary Medicine*, *16*, 37-46.
- Chiesa, A., & Serretti, A. (2011). Mindfulness based cognitive therapy for psychiatric disorders: A systematic review and meta-analysis. *Psychiatry Research*, *187*, 441-453.
- Chiesa, A., Calati, R., & Serretti, A. (2011). Does mindfulness training improve cognitive abilities? A systematic review of neuropsychological findings. *Clinical Psychology Review*, *31*, 449-464.
- Collins, R. L., Parks, G. A., & Marlatt, G. A. (1985). Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. *Journal of Consulting and Clinical Psychology*, *53*, 189-200.
- Dalai Lama. (2001). *Stages of Meditation: Training the Mind for Wisdom*. London: Rider.
- Dalai Lama, & Berzin, A. (1997). *The Gelug/Kagyü Tradition of Mahamudra*. New York: Snow Lion Publications.
- Davey, G. (2008). *Psychopathology: Research, assessment and treatment in clinical psychology*. Oxford: British Psychological Society and Blackwell Publishing.
- Day, A. (2009). Offender emotion and self-regulation: Implications for offender rehabilitation programming. *Psychology, Crime and Law*, *15*, 119-130.
- Delhee, K. H., & Cattell, R. B. (1971). *Manual for the Clinical Analysis Questionnaire (CAQ): Interim experimental edition*. Champaign, IL: Institute of Personality and Ability Testing.

- Derezotes, D. (2000). Evaluation of yoga and meditation trainings with adolescent sex offenders. *Child and Adolescent Social Work Journal, 17*, 97-113.
- Derogatis, L. R., & Melisaratos, N. (1983). The Brief Symptom Inventory: An introductory report. *Psychological Medicine, 13*, 595-605.
- Derogatis, L. R., Lipman, R. S., & Covi, L. (1973). The SCL-90. An outpatient psychiatric rating scale. *Psychopharmacology bulletin, 9*, 13-28.
- Donovan, D. M., & O'Leary, M. R. (1978). The Drinking-Related Locus of Control Scale: Reliability, factor structure and validity. *Journal of Studies on Alcohol, 39*, 759-784.
- Farrington, C. J. (2000). Individual Differences and Offending. In M. Tonry (Ed.), *The Handbook of Crime and Punishment* (pp. 241-268). Oxford: Oxford University Press.
- Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology and Behavioural Assessment, 29*, 177-190.
- Fjorback, L. O., Arendt, M., Ørnbøl, E., Fink, P., & Walach, H. (2011). Mindfulness-based stress reduction and mindfulness-based cognitive therapy - a systematic review of randomized controlled trials. *Acta Psychiatrica Scandinavica, 124*, 102-119.
- Fox, C. (2011). A new 'Compendium of reoffending statistics and analysis'. *Probation Journal, 58*, 76-78.
- Gilbert, P. (2009). Introducing compassion-focused therapy. *Advances in Psychiatric Treatment, 15*, 199-208.

- Gillespie, S. M., Mitchell, I. J., Fisher, D., & Beech, A. R. (2012). Treating disturbed emotional regulation in sexual offenders: The potential applications of mindful self-regulation and controlled breathing techniques. *Aggression and Violent Behavior, 17*, 333-343.
- Glass, G. V., McGaw, B., & Smith, M. L. (1981). *Meta-analysis in Social Research*. Beverly Hills, CA: Sage Publications.
- Griffiths, M. (1996). Behavioural addiction: An Issue for everybody? *Employee Counselling Today: The Journal of Workplace Learning, 8*, 19-25.
- Hawkins, M. A. (2003). Effectiveness of the "Transcendental Meditation" program in criminal rehabilitation and substance abuse recovery: A review of the research. *Journal of Offender Rehabilitation, 36*, 47-65.
- Himmelstein, S. (2010). Meditation research: The state of the art in correctional settings. *International Journal of Offender Therapy and Comparative Criminology, 20*, 1-16.
- Himmelstein, S. (2011). Mindfulness-based substance abuse treatment for incarcerated youth: A mixed method pilot study. *International Journal of Transpersonal Studies, 30*, 1-10.
- Himmelstein, S., Hastings, A., Shapiro, S., & Heery, M. (2012). Mindfulness training for self-regulation and stress with incarcerated youth: A pilot study. *Probation Journal, 59*, 151-165.
- Hofmann, S. G., Grossman, P., & Hinton, D. E. (2011). Loving-kindness and compassion meditation: Potential for psychological interventions. *Clinical Psychology Review, 31*, 1126-1132.

- Howells, K., Tennant, A., Day, A., & Elmer, R. (2010). Mindfulness in forensic mental health: Does it have a role? *Mindfulness, 1*, 4-9.
- Hutcherson, C. A., Seppala, E. M., & Gross, J. J. (2008). Loving-kindness meditation increases social connectedness. *Emotions, 8*, 720-724.
- Jadad, A. R., Moore, R. A., & Carroll, D. (1996). Assessing the quality of reports of randomized clinical trials: Is blinding necessary? *Controlled Clinical Trials, 17*, 1-12.
- Kabat-Zinn, J. (1990). *Full Catastrophe Living: Using the wisdom of your body and mind to face stress, pain and illness*. New York: Delacourt.
- Keysers, C. (2011). *The Empathic Brain: How the discovery of mirror neurons changes our understanding of human nature*. Chicago: Social Brain Press.
- Khyentse, D. (2006). *Zurhchungpa's Testament*. (Padmakara Translation Group, Trans.) New York: Snow Lion Publications.
- Lee, K.-H., Bowen, S., & An-Fu, B. (2010). Psychosocial outcomes of mindfulness-based relapse prevention in incarcerated substance abusers in Taiwan: A preliminary study. *Journal of Substance Use, Early Online*, 1-8. doi:10.3109/14659891.2010.505999
- Martin, G. W., Wilkinson, D. A., & Poulos, C. X. (1995). The Drug Avoidance Self-Efficacy Scale. *Journal of Substance Abuse, 7*, 151-163.
- McNair, D., Lorr, M., & Droppelman, L. (1992). *Profile of Mood States Text Manual*. San Diego, CA: Educational and Industrial Testing Service.
- Miller, W. R., Tonigan, J. S., & Longabaugh, R. (1995). The Drinker Inventory of Consequences (DrInC). In M. E. Mattson, & L. A. Marshall (Eds.), *Project MATCH Monograph Series Volume 4*. NIH Publications.

- Ministry of Justice. (2012a). *Criminal justice statistics: quarterly update to December 2011*. London: Author.
- Ministry of Justice. (2012b). *2012 Compendium of re-offending statistics and analysis*. London: Author.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement*. PLoS Med 6: e1000097. doi:10.1371/journal.pmed1000097
- Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality, 41*, 139-154.
- New Local Government Network. (2007). *Reducing re-offending: Creating the right framework*. London: Author.
- Novaco, R. W. (2007). Anger Dysregulation. In T. A. Cavell, & K. T. Malcolm (Eds.), *Anger, Aggression, and Interventions for Interpersonal Violence* (pp. 3-54). Mahwah, NJ: Erlbaum.
- Pace, W. W., Negi, L. T., Adame, D. D., Cole, S. P., Sivilli, T. I., Brown, T. D., . . . Raison, C. L. (2009). Effect of compassion meditation on neuroendocrine, innate immune and behavioural responses to psychosocial stress. *Psychoneuroendocrinology, 34*, 87-98.
- Parks, G. A. (2001). *The Daily Drug-Taking Questionnaire (DDTQ) - Version 1: A measure of typical and peak drug use*. Unpublished Manuscript, University of Washington.
- Perelman, A. M., Miller, S. L., Clements, C. B., Rodriguez, A., Allen, K., & Cavanaugh, R. (2012). Meditation in a deep south prison: A longitudinal study of the effects of vipassana. *Journal of Offender Rehabilitation, 51*, 176-198.

- PEW Centre on the States. (2011). *State of recidivism: The revolving door of America's prisons*. Washington: Author.
- PEW Research Centre. (2012). *Religion in Prisons: A 50-State Survey of Prison Chaplains*. Retrieved August 20, 2012, from PEW Research Centre Forum on religion and Public Life: <http://www.pewforum.org/Government/religion-in-prisons.aspx>
- Pont, J. (2008). Ethics in research involving prisoners. *International Journal of Prisoner Health, 4*, 184-197.
- Prison Reform Trust. (2012). *Bromley Briefings Prison Factfile*. London: author.
- Ranganathan, N., Bohet, A. K., & Wadhwa, T. (2008). Beyond the prison walls: reforming through silence. *Psychological Studies, 53*, 54-63.
- Rhead, J. C., & May, G. G. (1983). Meditation in a specialized correctional setting: A controlled study. *Corrective and Social Psychiatry and Journal of Behaviour Technology Methods and Therapy, 29*, 105-111.
- Rosenberg, M. (1979). *Conceiving the Self*. New York: Basic Books.
- Sahdra, B. K., Shaver, P. R., & Brown, K. W. (2010). A scale to measure nonattachment: A Buddhist complement to Western research on attachment and adaptive functioning. *Journal of Personality Assessment, 92*, 116-127.
- Salovey, P., Mayer, J. D., Goldman, S. L., Turvey, C., & Palfai, T. P. (1995). Emotional attention, clarity, and repair: Exploring emotional intelligence using the Trait Meta Mood Scale. In J. W. Pennebaker (Ed.), *Emotion, Disclosure & Health* (pp. 125-154). Washington DC: American Psychological Association.

- Samuelson, M., Carmody, J., Kabat-Zinn, J., & Bratt, M. A. (2007). Mindfulness-based stress reduction in Massachusetts correctional facilities. *The Prison Journal, 87*, 254-268.
- Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcomes expectancies. *Health Psychology, 4*, 219-247.
- Schulz, K. F., Altman, D. G., & Moher, D. (2010). CONSORT 2010 statement: Updated guidelines for reporting parallel group randomized trials. *Annals of Internal Medicine, 152*, 1-8.
- Seto, M., Marques, J. K., Harris, G. T., Chaffin, M., Lalumière, M. L., Miner, M. H., . . . Quinsey, V. L. (2008). Good science and progress in sex offender treatment are intertwined: A response to Marshall and Marshall (2007). *Sexual Abuse: A Journal of Research and Treatment, 20*, 247-255.
- Shacham, S. (1983). A shortened version of the Profile of Mood States. *Journal of Personality Assessment, 47*, 305-306.
- Shapiro, D. H. (1992). Adverse effects of meditation: a preliminary investigation of long-term meditators. *International Journal of Psychosomatics, 32*, 62-67.
- Simpson, T. I., Kaysen, D., Bowen, S., MacPherson, L. M., Chawla, N., Blume, A., . . . Larimer, M. (2007). PTSD symptoms, substance use, and vipassana meditation among incarcerated individuals. *Journal of Traumatic Stress, 20*, 239-249.
- Singh, N. N., Lancioni, G. E., Winton, A. S., Singh, A. N., Adkins, A. D., & Singh, J. (2011). Can adult offenders with intellectual disabilities use mindfulness-based procedures to control their deviant sexual arousal? *Psychology, Crime & Law, 17*, 165-179.

- Sumpter, M. T., Monk-Turner, E., & Turner, C. (2009). The benefits of meditation practice in the correctional setting. *Journal of Correctional Health Care, 15*, 47-57.
- Walter, L. J., Meresman, J. F., Kramer, T. L., & Evans, R. B. (2003). The Depression-Arkansas Scale: A validation study of a New Brief Depression Scale in as HMO. *Journal of Clinical Psychology, 59*, 465-481.
- Ward, T., & Willis, G. (2010). Ethical issues in forensic and correctional research. *Aggression and Violent Behaviour, 15*, 399-409.
- Waters, A. J., Raetzl, A. R., Cinciripini, P., Li, Y., Marcus, M. T., Vidrine, J. I., & Wetter, D. W. (2009). Associations between mindfulness and implicit cognition and self-reported affect. *Substance Abuse, 30*, 328-337.
- Wegner, D. M., & Zanakos, S. (1994). Chronic thought suppression. *Journal of Personality, 62*, 615-640.
- Witkiewitz, K., Marlatt, G. A., & Walker, D. (2005). Mindfulness-based relapse prevention for alcohol and substance use disorders. *Journal of Cognitive Psychotherapy: An International Quarterly, 19*, 211-228.
- Wright, S., Day, A., & Howells, K. (2009). Mindfulness and the treatment of anger problems. *Aggression and Violent Behaviour, 14*, 396-401.

Figure 1. Flow diagram of review process with reasons for exclusion

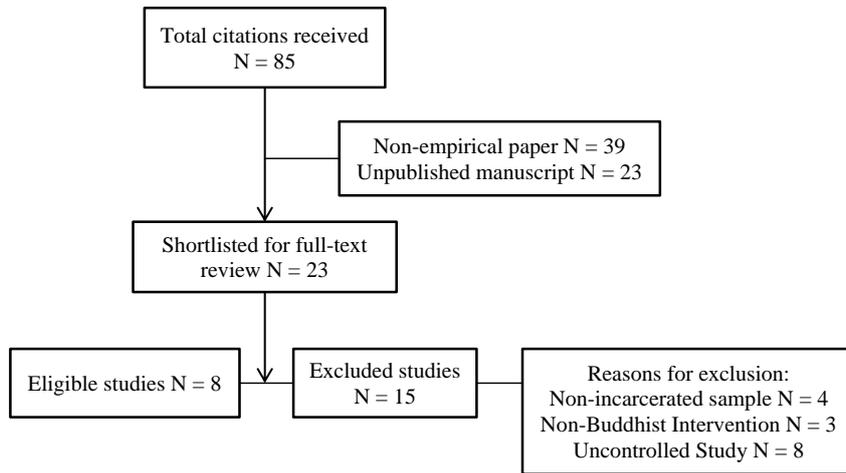


Table 1: Description and quality assessment of included studies

Study	Participants	Intervention	Outcomes	Quality score
<i>Mindfulness-based intervention studies</i>				
Lee, Bowen, & An-Fu (2010)	Adult males serving 1-year sentences for possession of supply of illicit substances. 10 MPRP, 14 TAU controls. (Taiwan)	10 week MBRP program. Weekly sessions of 1.5 hours duration. Delivered by clinical psychologists with two years meditation experience.	Significant increases for MBRP participants over controls in negative outcome expectancies and significant within-group improvements in depression and refusal self-efficacy.	Randomisation: yes Blinding: no Attrition: no <i>Jadad score: 1</i>
Samuelson, Carmody, Kabat-Zinn, & Bratt (2007)	Adults incarcerated for drug-related convictions. 1,953 MBSR, approximately 127 TAU controls. (US)	6-8 week MBSR programs with 12-20 prisoners per delivery. Weekly session duration ranged from 1 to 1.5 hours. Intervention was conducted in facilities ranging from designated 'quite rooms' to open space at the end of the prison gym.	Significant improvements for MBSR participants in hostility, self-esteem, and mood-disturbance. Women showed greater improvements than men. No significant changes were reported for controls. Effects were maintained at follow-up.	Randomisation: yes Blinding: no Attrition: no <i>Jadad score: 1</i>
<i>Vipassana meditation studies</i>				
Perelman et al. (2012)	Adult Males serving long-term sentences (including life without parole) mostly for violent offences. 60 VM, 67 comparative-treatment controls. (US)	Standard 'residential' 10 day VM silent retreat program conducted inside a prison gym where prisoners ate, slept, and meditated.	VM participants showed significant improvements over controls (that were partially maintained at follow-up) in post-intervention mindfulness, emotional intelligence, and mood disturbance.	Randomisation: no Blinding: no Attrition: no <i>Jadad score: 0</i>
Bowen et al. 2006	Minimum security adult male and female prisoners	Gender segregated 10-day VM program conducted in silence and	Significant reductions for VM participants in alcohol, crack cocaine	Randomisation: no Blinding: no

	with a SUD. 63 VM, 242 TAU controls. (US)	in isolation from other prisoners	and marijuana use plus less psychiatric symptomology, greater alcohol-related internal locus of control, and greater optimism.	Attrition: yes <i>Jadad score: 1</i>
Bowen, Witkiewitz, Dillworth, & Marlatt (2007)	Minimum security adult male and female prisoners with a SUD. 57 VM, 116 TAU controls. (US)	Gender segregated 10-day VM program conducted in silence and in isolation from other prisoners	Significant decreases in thought suppression for VM participants that partially mediated the effects of VM on post-release alcohol use.	Randomisation: no Blinding: no Attrition: yes <i>Jadad score: 1</i>
Simpson et al. (2007)	Minimum security adult male and female prisoners with a SUD. 29 VM, 59 TAU controls. (US)	Gender segregated 10-day VM program conducted in silence and in isolation from other prisoners	No significant associations for PTSD severity and treatment outcomes or likelihood of participating.	Randomisation: no Blinding: no Attrition: yes <i>Jadad score: 1</i>
<i>Other Buddhist-derived interventions</i>				
Rhead & May (1983)	Adult males serving indeterminate sentences. 6 intervention, 5 TAU controls. (US)	2 month program with weekly group meetings. Tibetan & Zen Buddhist meditation approaches.	Significant improvements for meditators over controls in overall psychological distress and psychopathological symptoms	Randomisation: no Blinding: no Attrition: yes <i>Jadad score: 1</i>
Sumpter, Monk-Turner, & Turner (2009)	Female adult detainees serving 20-week sentences. 17 meditators, 16 RAU controls. (US)	Seven week group-based meditation program (weekly meetings of 2.5 hours duration). Similar to Buddhist-based mindfulness meditation.	Meditators demonstrated significant improvements in sleeping difficulties over controls.	Randomisation: yes Blinding: no Attrition: no <i>Jadad score: 1</i>

Competing Interests

There are no competing financial interests to declare.