

Mindfulness Meditation and Substance Use in an Incarcerated Population

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Despite the availability of various substance abuse treatments, alcohol and drug misuse and related negative consequences remain prevalent. Vipassana meditation (VM), a Buddhist mindfulness-based practice, provides an alternative for individuals who do not wish to attend or have not succeeded with traditional addiction treatments. In this study, the authors evaluated the effectiveness of a VM course on substance use and psychosocial outcomes in an incarcerated population. Results indicate that after release from jail, participants in the VM course, as compared with those in a treatment-as-usual control condition, showed significant reductions in alcohol, marijuana, and crack cocaine use. VM participants showed decreases in alcohol-related problems and psychiatric symptoms as well as increases in positive psychosocial outcomes. The utility of mindfulness-based treatments for substance use is discussed.

Keywords: Vipassana, meditation, mindfulness, incarcerated, substance use

As a treatment for substance use disorders (SUDs), mindfulness practices can provide an environment that is tolerant of different religious beliefs, allows for flexible treatment goals, and has less associated stigma than traditional treatment programs. The goal of mindfulness training is not to change the content of thoughts, as in cognitive therapy, but to develop a different, nonjudgmental attitude or relationship to thoughts, feelings, and sensations as they occur (Teasdale, Segal, & Williams, 1995). Thus, mindfulness-based practices offer a treatment option for individuals who prefer alternatives to traditional treatment programs or who seek a spirituality-based approach but do not wish to participate in 12-step programs.

Research on meditation techniques for treatment of SUDs in incarcerated populations is limited, yet promising. Alexander, Walton, Orme-Johnson, Goodman, and Pallone (2003) reviewed

the use of transcendental meditation, a concentration-based technique, in incarcerated populations and found it to be effective in reducing recidivism. Results from a study of Vipassana meditation (VM) in a prison in India suggest that VM courses are related to reduced recidivism, depression, anxiety, and hostility and to increased cooperation with prison authorities (Chandiramani, Verma, & Dhar, 1998; Kumar, 1995; Vora, 1995).

VM courses were started under the guidance of Buddhist teacher S.N. Goenka and are typically conducted in standardized 10-day courses (Hart, 1987). Courses are offered at no charge throughout the world (see <http://www.dhamma.org>). VM courses teach mindfulness through objective, detached self-observation without reaction. This absence of reaction allows acceptance of thoughts and sensations as independent, impermanent events and not as direct reflections of the self. Course attendees practice up to 11 hr of meditation each day and watch videotaped discourses delivered by Goenka, which explicate Buddhist views of suffering, attachment, craving, and addiction (Marlatt, 2002). Participants are taught to observe experiences (e.g., craving) as impermanent events not necessarily requiring action (e.g., substance use), allowing the meditator to “let go” of compulsive thought patterns. Mindful awareness can thus help substance users discover alternatives to mindless, compulsive, or impulsive behavior (Marlatt, 2002).

The first Vipassana courses offered in a North American correctional facility were conducted at the North Rehabilitation Facility (NRF), a minimum-security adult jail in Seattle, Washington, with male and female inmates. The current study evaluates the short-term effectiveness of the VM course on reducing postincarceration substance use and its concomitant problems. This study represents a first step in determining the acceptability and effectiveness of VM as a treatment for problematic substance use. In addition, the study examines reduction in recidivism and improvements in psychosocial outcomes.

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Method

Individuals at NRF who voluntarily participated in the course were compared with inmates who did not take the course and only received treatment as usual (TAU). TAU, consisting of programs such as chemical dependency treatment and substance use education, was attended by more than 50% of the inmates. Other rehabilitation services offered included mental health services, adult education, general equivalency diploma testing, acupuncture, case management, and vocational programs.

Nine gender-segregated VM courses (five men's courses, four women's courses) were evaluated during a 15-month period. Participants for both the VM and TAU comparison groups were recruited from the facility during the week prior to each course. Study participants completed baseline measures 1 week before the start of the course. Participants then either attended the VM course or continued in TAU. Within 1 week of the end of the course, all participants completed a postcourse assessment. Follow-up assessments were administered 3 and 6 months after release from NRF. Participants received \$5 for baseline and postcourse assessments and \$30 for follow-up assessments.

To be eligible for the study, inmates had to remain in the facility (i.e., not be transferred or released) throughout the length of the VM course and be present in the facility at the time of postcourse assessment. As it was not possible to ascertain this at study enrollment, all interested inmates were asked for their consent and completed baseline assessment, with those still in the facility at the postcourse assessment eligible for follow-up participation. In all, 305 inmates completed baseline assessment (63 signed up for VM and 242 for TAU), and 173 of those completed a postcourse assessment (57 completed the VM course, and 116 participated in TAU). Eighty-seven participants (29 VM and 58 TAU) completed the postrelease 3-month assessment. Seventy-eight participants (27 VM and 51 TAU) completed the 6-month assessment.¹ Study participants were not required to attend the course, and course attendees were not required to participate in the research.

VM course participants were housed separately from the other inmates during the 10-day course and were not allowed outside contact. As the course was conducted in silence, they were instructed to refrain from speaking, except for questions to course staff or the instructor. Meditators began by focusing on observing the breath and calming the body. Beginning with Day 4, students began "body scans," or observations of physical, emotional, and mental experiences, with a focus on nonreaction to sensations.

Measures were administered via self-report at baseline, 3-month, and 6-month follow-up assessments. Information was obtained on age, gender, ethnic background, education level, employment status, and current religious practices. The Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985) and the Daily Drug-Taking Questionnaire (Parks, 2001) were used to assess alcohol use and 14 different drug categories. Both measures assessed quantity and frequency with a weekly calendar to measure drinking and drug use for both a typical week and the peak week in the past 90 days. The Short Inventory of Problems ($\alpha = .97$; Miller, Tonigan, & Longabaugh, 1995), a 15-item measure adapted from the Drinker Inventory of Consequences (Miller et al., 1995), assessed impulse control, social responsibility, and physical, interpersonal, and intrapersonal consequences during the past 3 months.

The 25-item Drinking-Related Locus of Control scale (Donovan & O'Leary, 1978; $\alpha = .84$) was used to assess perceptions of control over alcohol. The White Bear Suppression Inventory (Wegner & Zanakos, 1994; $\alpha = .92$) assessed thought suppression, and the Brief Symptom Inventory (Derogatis & Melisaratos, 1983; $\alpha = .98$) assessed psychiatric symptom severity along nine symptom dimensions, as well as assessing a global severity index. The Life Orientation Test (Scheier & Carver, 1985; $\alpha = .78$) was used to measure optimism.

High attrition rates in the postrelease follow-up period are consistent with previous studies of incarcerated populations (Farrington, Petrosino, & Welsh, 2001). To evaluate any systematic attrition biases, we compared

participants who completed the first three assessments ($n = 87$) with those who did not complete the study (postcourse = 130, 3 month = 88, $N = 217$). No significant differences ($\alpha = .05$) were found on baseline measures of age, gender, ethnicity, psychiatric symptoms, frequency of alcohol use, or level of education.

The current analyses included only those participants who completed postcourse assessment. The final sample size for current analyses was 173. Missing data, at the item or scale level, were estimated using maximum likelihood (Little & Rubin, 1987), which estimates the variance-covariance matrix on the basis of all available data, including the incomplete cases (Schafer & Graham, 2002). Because of higher attrition rates at the 6-month follow-up, analyses for the current study focus on 3-month outcomes.

To provide an omnibus test of the relationship between VM course participation and postincarceration substance use, we estimated a multivariate path model (see Figure 1). This model includes baseline (preincarceration) assessment of peak weekly substance use as a predictor of postincarceration peak weekly substance use 3 months after release from NRF.

The goal of this analysis was to test the influence of taking the course on the prediction of substance use outcomes after controlling for baseline levels of substance use. A significant positive regression weight would indicate that participation in the course is associated with significantly greater substance use, and a significant negative regression weight would indicate that participation in the course is associated with significantly less substance use, as compared with the TAU group.

Results

Participants were 79.2% men and 20.8% women, ranging in age from 19 to 58 years ($M = 37.48$, $SD = 8.67$). The majority (61.1%) of participants self-identified as European American, 12.6% as African American, 8.4% Latino/a, 7.8% Native American, 2.4% Alaskan Native, 2.4% Asian/Pacific Islander, and 5.4% as multiethnic or other. Approximately 25.6% of the sample had a middle school education or less, 57.2% had a high school education, and 17.3% had graduated from college. Thirty-two percent of the sample had been unemployed prior to incarceration, 19% had been employed part time, 39% had been employed full time, and 10% had received public assistance. Over 51% identified themselves as Christian, 10% as other (not specified), and 5% as agnostic. Buddhist, Jewish, and "multiple religions" together com-

¹ After giving their consent, 2 participants obtained release before baseline, 3 declined participation before baseline, and 15 became "ineligible" for unknown reasons, most likely release from jail. Of the 132 who did not complete the postcourse assessment, 126 were TAU participants and 6 were Vipassana course completers. Among these participants, 1 died, 4 transferred to another incarceration facility before assessment, 2 declined participation, 1 was ineligible because of the lack of a consent form, 1 escaped before assessment, and 121 were "ineligible," most likely because they were released before assessment. Eighty-seven participants did not complete the 3-month assessment. Of the 29 missing Vipassana meditation course participants, 20 were unreachable after release, 4 declined participation, 1 suffered from a severe medical condition and was dropped from the study by researchers, 3 completed 6-month assessment without returning their 3-month assessment, and 1 died. Of the 58 missing TAU participants, 49 were unreachable after release and 4 refused participation. For the 6-month assessment, the 14 participants who did not complete the follow-up included 5 Vipassana participants (2 who refused participation, 3 who could not be located) and 9 controls who could not be located after release.

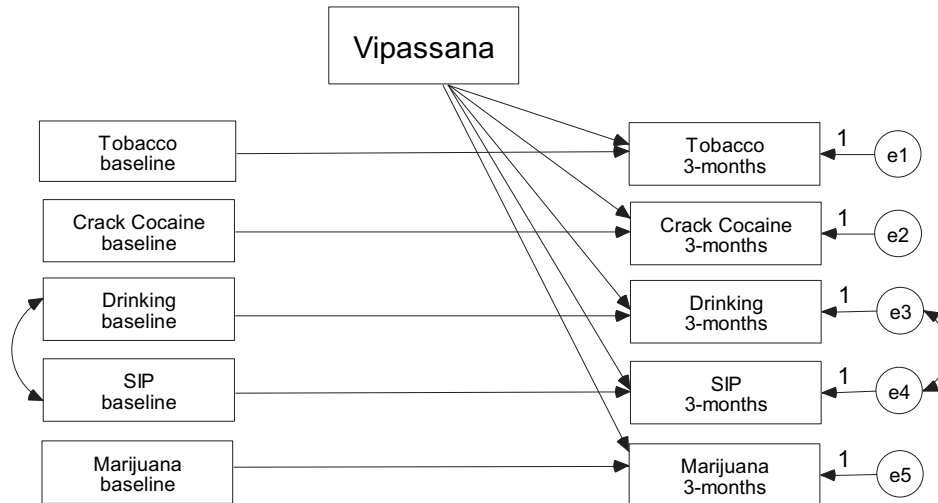


Figure 1. Hypothesized multivariate path model. SIP = Short Inventory of Problems. e = error variance. Arrows represent regression. The numeral 1 reflects that the error variances are set to equal 1.

prised less than 4% of the sample, and 28% endorsed no formal religion at the time of the baseline assessment.

In the 90 days prior to incarceration, the majority of residents in the sample reported using alcohol (83%), 83% had used tobacco, 48% had used amphetamines, 21% had used marijuana, 13% crack or powder cocaine, 18% heroin, and 12% other opiates or analgesics. Also, 10% had used hallucinogens and 5% had abused methadone. On average, those who consumed alcohol had drunk 52.87 ($SD = 33.88$) standard drinks in the last 90 days. Their peak day of drinking in the last 90 days averaged 8.31 ($SD = 8.75$) drinks. Participants reported an average score of 18.96 (15.31) on the Short Inventory of Problems, reflecting a medium level of alcohol-related negative consequences.

Independent samples t tests and chi-square tests revealed no significant differences between the VM and TAU groups on any of the baseline substance use or psychosocial indexes, nor were there differences on demographic variables, including gender, income, education, or ethnicity. The most frequently used drugs at the 3-month follow-up assessment were estimated simultaneously by using a multivariate path model (88% used alcohol in the 3 months after release, 21% marijuana, 34% crack cocaine, and 72% tobacco). Because of the low base rate of heroin use (14%) and powder cocaine use (13%), these drugs were not included in subsequent analyses.

Mean differences between groups from baseline to the 3-month follow-up were assessed. As shown in Table 1, when compared with TAU, the VM group reported significantly less substance use across four of the five outcome measures. The multivariate path model (see Figure 1) provided an adequate fit to the data: comparative fit index = .88, $\chi^2_{min}(43) = 69.73$; root-mean-square error of approximation = .06 (95% confidence interval = .03, .09). Course participation was a dichotomously scored variable, assessing the strength of prediction of course participation on outcomes. For all outcomes at 3 months, the baseline values were covaried to control for previous levels of use. Because of the overlap between variables, correlations were estimated for alcohol use and alcohol-related consequences at baseline and 3 months. As shown in Table

2, the regression weights indicate a significant relationship between course participation and 3-month measures of marijuana use, crack cocaine use, alcohol use, and alcohol-related negative consequences, suggesting that course participation was associated with decreases in use of these substances 3 months after release from NRF. No significant relationship was found between course participation and tobacco use.²

We then evaluated the differences between the two groups on several psychosocial variables, using a multivariate path model. The model was constructed in the same manner as the previous model but tested psychosocial variables in place of the substance-related outcomes. As with the previous model, this model fit the data well: comparative fit index = .92, $\chi^2_{min}(18) = 40.19$; root-mean-square error of approximation = .085 (95% confidence interval = .05, .12). As shown in Table 2, the regression weights indicate a significant relationship between course participation and 3-month outcomes on psychiatric symptoms, drinking-related locus of control, and optimism in the expected directions; that is, course participants exhibited greater decreases in psychiatric symptoms and greater increases in internal drinking-related locus of control and optimism. Course participation was not significantly

² Alternatively, we analyzed these data by conducting a multiple-groups analysis, in which we compared the fit of the relationship between baseline and 3-month outcomes across each group using nested model comparisons whereby the paths from baseline to 3-month outcomes were set to equality across groups and the fit of this constrained model was compared with the fit of an unconstrained model in which the paths were allowed to vary across groups. In this analysis, the constrained model provided a significantly worse fit to the data, $\chi^2_{min}(5) = 32.53$, $p < .01$. We also looked at the mean differences in 3-month outcomes within this framework by comparing a constrained intercept model with an unconstrained model. Again, this model provided a significantly worse fit to the data, $\chi^2_{min}(10) = 59.01$, $p < .01$. In both analyses the direction of the relationship was consistent, such that the control group had significantly worse outcomes at 3 months as compared with those who took the Vipassana course.

Table 1
Mean Substance Use and Consequences in Vipassana and TAU Groups

Substance	Mean use and consequences by assessment time			
	Baseline		3-month follow-up	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Alcohol (drinks per peak week) ^a				
Vipassana	64.83	73.01	8.38	13.37
TAU	43.98	55.61	27.77	46.37
Crack cocaine (% days used) ^a				
Vipassana	29	43	10	27
TAU	26	41	21	36
Tobacco (% days used)				
Vipassana	83	37	61	49
TAU	79	40	74	43
Marijuana (% days used) ^a				
Vipassana	28	40	03	08
TAU	31	42	16	33
Short Inventory of Problems (mean total score) ^{a,b}				
Vipassana	20.98	14.86	8.46	12.25
TAU	17.95	15.50	13.94	15.33

Note. TAU = treatment as usual.

^a Group × Time interaction was significant at $p < .05$. ^b A score of 19–22 is considered midlevel severity of problems.

related to thought suppression, as measured by the White Bear Suppression Inventory.

Although VM course participants who had been released at least 6 months prior to final analysis had a slightly lower average number of bookings than did TAU participants (0.61 vs. 0.67), there were no significant differences between VM course participants and the TAU group in proportion of participants with any recidivism, $\chi^2(1, N = 173) = 0.12, p = .73$. However, base rates of recidivism might have been too low to detect differences. The mean number of bookings in the 6 months following release was less than one, with 72% of all participants with no bookings, 15% with only one booking, and the remaining 13% with two to four bookings.

Discussion

Results from this study provide preliminary support for the effectiveness of VM as a treatment for SUDs in correctional populations. Across three different substances (alcohol, marijuana, and crack cocaine), there was a significant relationship between participation in the VM course and postincarceration substance use, such that NRF residents who participated in VM reported significantly less use of each of these substances and significantly fewer alcohol-related negative consequences 3 months following release from NRF.

Because of the high prevalence of co-occurring disorders in incarcerated populations (Abram & Teplin, 1991), it is noteworthy that the results also provide preliminary support for the effectiveness of VM in improving psychosocial functioning. After controlling for baseline levels of these variables, we found that individ-

uals who participated in the Vipassana course reported significantly lower levels of psychiatric symptoms, more internal alcohol-related locus of control, and higher levels of optimism. Consistent with these findings, several behavioral therapies have used meditation or mindfulness-based techniques with such clinical problems as depression (Segal, Williams, & Teasdale, 2002; Teasdale et al., 1995), chronic pain (Kabat-Zinn et al., 1992), and borderline personality disorder (Linehan, 1993).

The findings from this investigation should be interpreted with caution because of a number of limitations. The primary limitation was the lack of a randomized controlled design. Jail staff and VM teachers were already conducting courses with inmates prior to the start of the current research. It was critically important to the staff and teachers that all interested inmates be given access to the course because of the infrequency of course availability and inmates' relatively short duration of incarceration. Random assignment would have denied some inmates the opportunity to participate in the VM course. The lack of a randomized design limits our ability to demonstrate conclusively the efficacy of VM as a treatment for SUDs, independent of other variables that might have influenced participation. However, this aspect also provides advantages with respect to external validity. The self-selection of participants in the VM course was necessary to evaluate the effectiveness of mindfulness training with incarcerated individuals willing to participate in the 10-day program.

Furthermore, all participants completed follow-up measures 3 months following their release from NRF. Thus, number of days between course completion and postrelease follow-up varied across individuals. Another consideration is that the 3-month follow-up period may have been too short to examine relationships between course participation and long-term health and legal outcomes. Moreover, all measures were self-report. However, study participants were assured that responses would be kept confidential, thereby increasing reliability and validity of self-report data (Babor, Stephans, & Marlatt, 1987; Darke, 1998).

In addition, no adherence or mindfulness measures were given during or following the course to assess whether participants understood and correctly practiced the techniques. The course setting (i.e., in a separate, silent, smoke-free environment with

Table 2
Regression Weights for Outcomes Regressed on Course Participation

3-month outcome	β	Estimate	<i>SE</i>
Marijuana	-.25*	-0.15	0.06
Crack cocaine	-.19*	-0.14	0.07
Alcohol	-.26*	-22.18	8.52
Short Inventory of Problems total score	-.19	-0.39	0.18
Tobacco	-.16	-0.16	0.10
Psychiatric symptoms	-.17*	-0.24	0.12
Locus of control	-.21*	-0.08	0.04
Optimism	.23*	0.25	0.10
Thought suppression	-.12	-0.24	0.19
Psychiatric symptoms	-.17*	-0.24	0.12

Note. All autoregressive paths (i.e., baseline marijuana use predicting 3-month marijuana use) were significantly different from zero at $p < .0005$.

* $p < .05$.

vegetarian meals) may have played a role in the improvement of the participants. It is therefore not clear whether effects of course participation were due to mindfulness training or other course characteristics.

Finally, although VM courses provide a no-cost, widely available alternative treatment for substance use, there are several potential barriers to access. The 10-day, residential course might prohibit participation by individuals who are unable to commit to 10 days because of work, family or other obligations. Also, the intensive schedule, prolonged periods of sitting, focus on Eastern philosophy, and mandatory isolation from the outside world (e.g., reading, writing, or speaking to others is prohibited for the duration of the course) may all be course deterrents.

The promising findings of the present study suggest a number of areas for future research. First, replication of the current study in a randomized controlled trial is needed to evaluate the efficacy of VM as a substance abuse treatment. Second, the effectiveness and efficacy of the VM course needs to be evaluated in nonincarcerated populations and in comparison to established treatments for substance abuse. Third, it would be of interest to investigate whether or not other modalities of mindfulness training yield similar results. In this vein, Witkiewitz, Marlatt, & Walker (2006) proposed a mindfulness-based relapse prevention program, based on mindfulness-based stress reduction (Kabat-Zinn, 1982) and mindfulness-based cognitive therapy for depression (Segal et al., 2002).

Psychosocial treatments for SUDs are commonly found to be inaccessible, expensive, stigmatizing, and undesirable by the majority of individuals who meet criteria for substance dependence or abuse (Marlatt & Witkiewitz, 2002). VM is a low-cost alternative to existing treatment programs and a low-stigma alternative to Alcoholics Anonymous and Narcotics Anonymous approaches. Also, VM provides an emphasis on fellowship and spirituality but does not require abstinence or focus specifically on substance abuse. As such, VM may be more acceptable for those who do not align with the Alcoholics Anonymous/Narcotics Anonymous philosophy or who are interested in pursuing moderation goals (Marlatt, 2002; Marlatt & Witkiewitz, 2002). The preliminary data from the current study provide a demonstration of the possible benefits of VM course participation in an incarcerated population. Future research should investigate the efficacy of VM in a randomized trial.

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