

A Systematic Review of Gender Differences in the Effectiveness of Mindfulness-Based Treatments for Substance Use Disorders

Danielle Katz · Brenda Toner

Published online: 1 September 2012
© Springer Science+Business Media, LLC 2012

Abstract Substance use disorder (SUD) onset, trajectory, comorbidity, and outcome can differ greatly according to sex and gender. Mindfulness-based interventions are promising treatments for SUD; however, as of yet, no systematic review has organized the results of studies examining these treatments according to gender. The purpose of this review was to determine whether gender influences the efficacy and effectiveness of mindfulness-based treatments (MBTs) for substance use. A systematic review was conducted on journal databases, and out of 36 papers that met the criteria for inclusion, 6 included participant gender as a variable. Two papers based on one randomized controlled trial study failed to find gender differences in the efficacy of MBTs for substance use, though a number of quasi-experimental studies and case series did find that women gravitated more towards MBTs or that women may have benefitted more from mindfulness interventions. Overall, MBTs hold promise as treatments for SUD. Additional research on mindfulness-based interventions for SUDs is needed that includes gender as a variable.

Keywords Mindfulness · Substance use · Gender · Mindfulness-based relapse prevention · Acceptance and commitment therapy · Dialectical behavior therapy · Vipassanā meditation · Mindfulness-based cognitive therapy · Mindfulness-based stress reduction · Spiritual self-schema

Introduction

Substance use disorder (SUD) onset, trajectory, comorbidity, and outcome can be greatly influenced by an individual's sex and gender. Compared to male substance abusers, women who use substances are more likely to experience adverse medical and social consequences (Brady and Randall 1999). Though a certain degree of stigma is associated with substance use in general, women who misuse substances experience far more stigma than men (Brady and Randall 1999). As well, the medical consequences of substance use for women are often more severe and female substance misusers have a higher risk of both physical and sexual victimization. Despite these areas of increased risk, until the early 1990s, the majority of substance abuse research used mainly male samples (Greenfield et al. 2007). Today, additional research is still needed on ways of increasing effectiveness and accessibility of substance use services for female populations.

The need for research on substance use treatment and services for women is partly due to the different circumstances surrounding substance use for women and men. Indeed, the developmental course of SUDs in women and men is quite dissimilar. Although the overall rate of substance use is higher in men, women can often experience more severe medical consequences of alcohol use. For example, women are more likely to develop cirrhosis of the liver or hepatitis due to alcoholism (Saunders et al. 1981). Women also typically begin to use substances at an older age than men; however, substance use in women often has a telescoped trajectory, in that the length of time between first substance use and seeking treatment for substance misuse is truncated compared to the course of substance use in men (Greenfield et al. 2010).

The psychological correlates of SUDs also seem to differ according to gender. Women are more likely to have

D. Katz (✉)
Department of Psychology, York University,
Toronto, ON, Canada
e-mail: katzdani@yorku.ca

B. Toner
Department of Psychiatry, University of Toronto,
Toronto, ON, Canada

preexisting mood and anxiety disorders before developing an SUD, as well as comorbid affective disorders upon having developed an SUD (de Graaf et al. 2002; Zilberman et al. 2003). The rates of physical and sexual abuse are also much higher for women with SUDs than for the general population, and as in the general population, women with SUDs are more likely to have experienced sexual assault than men with SUDs (Gutierrez and Todd 1997; Simpson and Miller 2002). Reasons for substance use may also differ between men and women. For example, some studies have found that alcohol-dependent women are more likely to drink in response to negative affect or stressful events than men and are more likely to use alcohol to alter their mood (King et al. 2003; Olenick and Chalmers 1991; Rubonis et al. 1994; Zywiak et al. 1996). In tobacco abuse literature, research suggests that women are more likely to cite negative affect and weight control as reasons for smoking (Ward et al. 1997; Berlin et al. 2003).

Women and men may also have different relapse patterns. A recent review of gender differences in substance use relapse cues found that women are more likely than men to have an alcohol relapse in response to family or marital problems and are more likely to experience a drug relapse in response to unpleasant affect and interpersonal problems (Walitzer and Dearing 2006). For men, on the other hand, marriage has been found to be a protective factor against relapse (Schneider et al. 1995). Depression and childhood sexual abuse are risk factors for substance use relapse in both genders (Greenfield et al. 2007; Walitzer and Dearing 2006); however, as previously mentioned, female substance misusers are more likely to have depression or to have experienced childhood sexual abuse than men. Despite research suggesting gender differences in relapse cues, two systematic reviews have found that there are no overall gender differences in relapse rates (Greenfield et al. 2007; Walitzer and Dearing 2006). The one exception may be tobacco use, in which women have a higher relapse rate than men (Ward et al. 1997).

One promising intervention for SUDs is mindfulness meditation. Mindfulness entails a nonjudgmental awareness of experiences as they occur in the here-and-now (Kabat-Zinn, 2005). Clients who are taught mindfulness learn to recognize that their internal experiences are temporary and subjective projections rather than permanent and accurate representations of reality (Appel and Kim-Appel 2009). Thus, clients are taught to be aware of internal and external experiences without judging themselves based on these experiences or acting automatically in response to these experiences (Segal et al. 2002). Mindfulness can thus aid clients in gaining a greater insight into their habitual cognitive and behavioral patterns and in learning to react consciously and thoughtfully rather than automatically or on impulse (Kabat-Zinn 2005; Appel and Kim-Appel 2009). A number of different therapies teach mindfulness skills or are

based on mindfulness principles, such as mindfulness-based cognitive therapies (MBCT), dialectical behavior therapy (DBT), acceptance and commitment therapy (ACT), and spiritual self-schema (3-S) therapy. However, besides their shared use of mindfulness, each of these therapies can have quite different philosophical bases and organization (Chiesa and Malinowski 2011).

There are a variety of possible mechanisms by which mindfulness can aid in substance use relapse prevention. Thought suppression is one psychological mechanism that may be related to substance use relapse. Suppressing thoughts counterintuitively makes them more available to conscious attention, and individuals who are unsuccessful at quitting substances have been found to have higher rates of thought suppression than those who are successful (Salkovskis and Reynolds 1994; Palfai et al. 1997; Toll et al. 2001). Rather than ask clients to suppress or avoid substance use-related thoughts, mindfulness meditation encourages clients to be aware of their urges, recognize that the urges are temporary, and then wait for them to pass. Indeed, one study of mindfulness meditation and substance use found that changes in level of thought suppression mediated the relationship between mindfulness intervention and reduced substance use (Bowen et al. 2007).

Another mechanism through which mindfulness might decrease substance use relapse is by changing a client's relationship to stress and negative affect. Stress and negative affect are potent risk factors for relapse, particularly among women (Sun 2007). When an individual is being mindful, she is more aware of her stress responses, is able to maintain a sense of calmness and balance, and can choose to act thoughtfully rather than revert to an automatic fight or flight reaction that may increase the stress (Kabat-Zinn 2009). It has been suggested that mindfulness may help desensitize individuals towards negative affect and make difficult emotions more tolerable (Breslin et al. 2002). As well, through increasing relaxation and reducing tension, mindfulness meditation may provide an alternative to substance use for stress reduction and reducing negative affect (Marlatt and Chawla 2007; Hsu et al. 2009). Indeed, mindfulness-based interventions have been linked to decreases in stress and anxiety (Shapiro et al. 2007; Goldin and Gross 2010). Mindfulness-based therapies, such as MBCT, have also been found to be effective at reducing negative affect (e.g., Shapiro et al. 2007) and depressive relapses (Segal et al. 2002).

Finally, it has recently been found that trait mindfulness is lower in populations of substance users as compared to the general population and in polysubstance users as compared to monosubstance users. This finding is unsurprising as many of the traits that characterize substance use, such as impaired self-regulation and impulsive behavior in response to cues, are contradictory to mindful practice (Dakwar et al. 2011). Therefore, training substance users to be more mindful in

response to stressful, triggering situations would most likely be a beneficial intervention.

Despite the promise of mindfulness-based treatments (MBTs) as interventions for substance use and the recorded differences in substance use patterns and relapse between men and women, as of yet, there has been no systematic review that has united these topics of gender and substance use with mindfulness. The purpose of this paper is to review the efficacy and effectiveness of MBTs and to explore whether results differ according to gender.

Method

A search was conducted of the electronic resources PsycINFO, MEDLINE, and references of retrieved articles. The search included papers published in English up until and including April 2011. The keywords used were mindfulness, substance use, substance abuse, Vipassanā, dialectical behavior therapy, acceptance and commitment therapy, and spiritual self-schema. The titles and abstracts of identified studies were screened by the primary author. The criteria for inclusion were (1) the study intervention must include a mindfulness component or be mindfulness based; (2) the focus of the research must be a population with SUDs; (3) the study must include post-intervention assessment measures; (4) the study must be published in a peer-reviewed journal. Reasons for exclusion were (1) reviews and meta-analysis and (2) non-English publication.

Results

The electronic resources search revealed 2,231 articles. Sixty-one of these articles were selected for reading, and 36 met the criteria for review inclusion. Out of the final 36 articles, 12 were randomized controlled trials (RCTs). Though they each include a mindfulness component, beyond that element, the interventions included in this review can be quite different in both tasks and philosophies (Chiesa and Malinowski 2011). Therefore, the results will be organized first by gender and then by intervention type. For chart of studies included in the review, see Table 1.

Gender Differences

Out of 36 papers, 6 measured gender differences (Simpson et al. 2007; Bowen et al. 2009; Marcus et al. 2009; Britton et al. 2010; Chen et al. 2010; Witkiewitz and Bowen 2010). Two of these papers were based on one RCT study comparing mindfulness-based relapse prevention (MBRP) to a 12-step treatment (Bowen et al. 2009; Witkiewitz and Bowen 2010), three were quasi-experimental design (Simpson et al.

2007; Marcus et al. 2009; Chen et al. 2010), and one was a case series examining mindfulness meditation as part of an unspecified multicomponent intervention (Britton et al. 2010). The study on which the RCTs are based did not find significant gender differences on outcome results between interventions (Bowen et al. 2009; Witkiewitz and Bowen 2010). As part of this systematic review, we conducted a power analysis of the original RCT study using GPOWER (Faul et al. 2009) and found that, if we assume a power of 0.8, the study had a sufficient sample size to detect gender differences at a moderate effect size ($d=0.45$), but not a small effect size. Of the three quasi-experimental designs, a study by Chen et al. (2010) comparing Qigong meditation to a relaxation- and education-based intervention found that women in both groups had higher levels of craving and withdrawal at baseline as compared to men and showed greater reduction in craving and withdrawal over the course of the treatment. Furthermore, women in the Qigong meditation group showed greater reductions in anxiety and withdrawal than women in the comparison group or men in any group (Chen et al. 2010). The second quasi-experimental study by Marcus et al. (2009) compared stress levels in a mindfulness-based therapy offered in a treatment community to an intervention chemical dependency training, life skills coaching, and cognitive restructuring and found that women in both treatment groups had higher stress levels than men. The quasi-experimental study by Simpson et al. (2007) compared Vipassanā meditation (VM) to an intervention that included chemical dependency treatment and mental health services and found that women were more likely to self-select for VM, but that VM was equally effective for both genders. Finally, a case series by Britton et al. (2010) examining mindfulness meditation and comparing those who completed treatment with those who did not complete treatment found that women who completed the mindfulness meditation course of treatment initially decreased and then increased substance use, while women who did not complete treatment and all males increased at each time point. In conclusion, the research is slightly mixed. Studies based on an RCT did not find gender differences, while some less rigorously designed studies have found that women are more attracted to MBTs than men or that women fare better in such treatments.

Female Populations

Ten studies examined female-only populations. Of these, three were RCTs, two examining DBT for substance abuse (DBT-SA) and one focusing on standard DBT (Linehan et al. 1999, 2002; van den Bosch et al. 2002). Of the remaining studies, four were case series (Dimeff et al. 2000; Avants et al. 2005; Amaro et al. 2010; Axelrod et al. 2011), one was a

Table 1 Description of the articles included in the review

Authors, year	Type of study	Number of participants	Type of substance measured for outcome	Intervention	Comparison intervention	Outcome	Follow-up	Gender differences
Alleman et al. 2004	RCT	31, 54.8 % female	AOD	Mindfulness meditation with substance abuse focus	Typical residential treatment with TSF focus and behavioral modification	Medical problems decreased in mindfulness group, increased in tau group. Both groups had decreases in AOD- and family-related problems. No differences in urine toxicology found between groups during treatment.	Five-month post-entry follow-up: no significant differences between groups on urine toxicology.	NA
Anaro et al. 2010	Case series	13, 100 % female	AOD	3-S	None	Seven completed intervention. The majority said that they felt closer to quitting drugs, reported decrease in drug use, and experienced shift from addict to spiritual self.	20-weeks post-entry: motivation to change drug use continued to increase at follow-up.	NA
Avants et al. 2005	Random assignment to individual or group 3-S, no control	29, 100 % female	Cocaine and opioids	3-S	None	Participants identified faster with spiritual self. Significant decrease in drug use. There was a decrease in HIV risk behavior. Abstinence associated with spiritual coping.	NA	NA
Axelrod et al. 2011	Case series	27, 100 % female	AOD	DBT	None	No sig. differences between individual and group 3-S on drug measures. Significant reduction in substance use from pretreatment to posttreatment.	NA	NA
Batten and Hayes 2005	Case study	1 woman	Methamphetamine, alcohol, cocaine, marijuana, tobacco	ACT	None	Reduction of complex trauma symptoms.	One-year follow-up: one aversive methamphetamine relapse, occasional use of marijuana and alcohol, depression remained low, began smoking again.	NA
Beitel et al. 2007	Case series	29 women	All had opiate dependence, majority had cocaine abuse or dependence	3-S	None	Participants rated meditation as aspect of 3-S they liked most. The majority felt that interpersonal functioning had improved.	NA	No sig gender difference in grounded theory-generated category frequency.
Boozin and Stevens 2005	Case series	55, 38 % female	AOD	Mindfulness meditation, derived from MBSR, as part of multicomponent intervention	None	Participants who completed 4 or more sessions had sig. improvement over noncompleters on sleep behavior. Drug use increased during treatment for both completers and noncompleters. All participants had reduction in worry and sleepiness.	12-month follow-up: drug problems decreased for completers, increased for noncompleters.	No gender difference between completers and noncompleters.
Bowen et al. 2006	Quasi-experimental	305, 20.8 % female	AOD, tobacco	VM	Chemical dependency treatment, substance use education	No measures provided for immediately at the end of treatment.	3-month follow-up: VM participation related to sig. lower drug and alc. use, but not sig. lower tobacco use.	NA
Bowen et al. 2007	Quasi-experimental		Alcohol	VM			3-month follow-up: pts. in VM reported greater decreases in	NA

Table 1 (continued)

Authors, year	Type of study	Number of participants	Type of substance measured for outcome	Intervention	Comparison intervention	Outcome	Follow-up	Gender differences
Bowen et al. 2009	RCT	Same sample as Bowen et al. 2006 168, 63.7 % male	AOD	MBRP	Chemical dependency treatment, substance use education	No measures provided for immediately at the end of treatment.	attempts to avoid thoughts than Pts. in TAU. Changes in levels of avoidance partially mediated relationship between VM and alc. use.	
Brewer et al. 2009	RCT	25, 72 % male	AOD	MBRP with minor modifications (Yoga removed, sessions shortened to approximately 1 h)	TSF, process-oriented format (standard outpatient care) CBT	Significant decrease in AOD use among MBRP as compared to TSF. No sig. difference between treatments in alc. or cocaine use. Participants who received MBRP had attenuated psychological and physiological stress responses to stress provocation in laboratory-induced conditions.	4-month follow-up: difference in AOD use between MBRP and TSF decayed. NA	Gender not a significant moderator of effects NA
Britton et al. 2010	Case series	See Bootzin and Stevens 2005	AOD	Mindfulness meditation, derived from MBSR, as part of multicomponent intervention	None	23 completed at least 4 out of 6 sessions, 18 attended last session. Substance use increased over all follow-up points. Time spent meditating positively correlated with time spent sleeping, higher self-efficacy. Increased total sleep time associated with decreased substance use-related problems.		Female completers decreased substance over course of treatment to 20-week follow-up, increased at 60 weeks, while all male participants and female noncompleters increased at each time point.
Chen et al. 2010	Quasi-experimental	350, no info on gender %	AOD	Qigong meditation	SMART-, standard relaxation-, and education-based intervention	Qigong reported greater reduction in craving than SMART. Participants in both groups experienced sig. reductions in depression, anxiety, withdrawal symptoms, sleep problems.	NA	Females had higher craving and withdrawal upon entering treatment, showed more reduction at 2 weeks into treatment. Females in qigong had greater reductions in anxiety and withdrawal than any other group. NA
Courbasson et al. 2011	Case series	38, 79 % female; all with binge eating disorder	AOD	Mindfulness action-based CT	None	Decrease in AOD scales for addiction severity	NA	NA
Davis et al. 2007	Case series	18, 44.4 % female	Tobacco	MBSR	None	5 dropped out of the treatment before the end date. No outcome measures provided for posttreatment date. For those who completed treatment, drug use declined, abstinence achieved, increase on social adjustment scale and reduction in trait anger	6-week follow-up: 10 pts. achieved abstinence, while three quit but relapsed before 6-week follow-up NA	NA NA
Dimeff et al. 2000	Pilot, case series	3, 100 % female with BPD	Methamphetamine, cocaine, opiates, benzodiazepine	DBT-SA	None	Both interventions lead to sig. reductions in stress overtime, but MORE lead to larger decrease in stress. Both treatments reduced psychiatric symptoms.	NA	NA
Garland et al. 2010	RCT	53, 21.8 % female	Alcohol	Mindfulness-oriented recovery enhancement intervention (MORE)	Alcohol dependence support group derived from matrix model treatment manual		NA	NA

Table 1 (continued)

Authors, year	Type of study	Number of participants	Type of substance measured for outcome	Intervention	Comparison intervention	Outcome	Follow-up	Gender differences
Gifford et al. 2004	RCT	76, 59 % female	Tobacco	ACT	Nicotine replacement therapy	Neither intervention influenced alc. cravings. MORE associated with decreases in thought suppression and alcohol approach bias.	One-year follow-up: using worst-case scenario, ACT had significantly better long-term outcomes. 6-month follow-up: ACT had marginally significantly lower self-reported amounts of total drug use.	NA
Hayes et al. 2004	RCT	138, 51 % female	Opiates and other drugs	ACT+methadone	TSF+methadone; methadone alone (MM)	No sig. difference between ACT and TSF for negative urinalysis. No sig. difference between ACT or MM on urinalysis using intent to treat analysis. Both ACT and TSF had improvements on distress and adjustment.	NA	NA
Heffner et al. 2003	Case study	1 male	Alcohol	ACT	None	Achieved abstinence. Lower symptom distress on OQ45. Interpersonal relationship scores remained in clinical range.	9-month follow-up: maintained near perfect abstinence over follow-up period.	NA
Linehan et al. 1999	RCT	28, 100 % female with BPD	AOD	DBT-SA	Referred to alternative mental health counselors	Using intent to treat analysis, DBT ps. had sig. higher proportion of drug and alc. abstinence days at 4 months as well as the overall year total. DBT condition had better retention.	16-month follow-up: DBT ps. had sig. higher proportion of drug and alc. abstinence days.	NA
Linehan et al. 2002	RCT	23, 100 % female with BPD	Opiates and other drugs	DBT-SA	Comprehensive validation therapy with 12-step additions	CVT-12S had significantly higher retention rate than DBT-SA. At 1 year, DBT-SA had lower percentage of opiate positive urinalysis than CVT. Significant decreases in self-stigma and shame, experiential avoidance. Significant increases in social support, self-esteem.	16-month follow-up: no sig. between condition differences in urinalysis	NA
Luoma et al. 2008	Case series	88, 53.4 % female	AOD	ACT	None	Cocaine-free urinalysis. Identified more with spiritual self than addict self.	NA	NA
Marcotte et al. 2003	Case study	1 male	Heroin and cocaine	3-S	None	MBTC group had overall lower cortisol levels. Overall stress over time trends for two groups not significantly different.	NA	NA
Marcus et al. 2009	Quasi-experimental	459, 17.6 % female	AOD	MBTC (MBSR adapted for a therapeutic community)	Chemical dependency treatment, life skills counseling, cognitive restructuring	86.4 % of 3-S completers had opiate-free urine, 52.9 % had cocaine-free urine. 3-S completers less likely to engage in HIV risk behavior as compared to control condition.	NA	Women in both groups had higher stress levels.
Margolin et al. 2006	RCT	72 methadone-maintained clients, 65 % female	Drugs	3-S	MM	3-S Ps. had sig. greater decreases in impulsivity than those in	NA	NA
Margolin et al. 2007	Quasi-experimental	38, 50 % women	AOD	3-S	MM		NA	NA

Table 1 (continued)

Authors, year	Type of study	Number of participants	Type of substance measured for outcome	Intervention	Comparison intervention	Outcome	Follow-up	Gender differences
Simpson et al. 2007	Quasi-experimental	See Bowen et al. 2006	AOD	VM	Chemical dependency treatment, substance use education	No results provided for immediately posttreatment.	3-month follow-up: VM participation predicted lower substance use. Women more likely to self-select for VM; VM appears to be equally beneficial for both genders.	
Singh et al. 2011	Case study	1 male	Tobacco	Mindfulness-based smoking cessation program ACT	None	Tobacco abstinence achieved at 3 months, maintained for a year.	Abstinence maintained for 3 years of follow-up.	NA
Snout et al. 2010	RCT	104, 40 % female	Methamphetamine and other drugs	ACT	CBT	Both groups had sig. reductions in self-reported methamphetamine use, but only CBT showed sig. improvements using hair analysis.	24-week follow-up: CBT plus reported significantly increased perceived negative consequences of methamphetamine use, while ACT only approached significance.	NA
Twobig et al. 2007	Case series	3, 33.3 % female	Marijuana	ACT	None	Abstinence from marijuana at the end of treatment.	3-month follow-up: resumption of marijuana use at follow-up for 2/3 participants, though consumption rate was lower than baseline rate.	NA
Vallejo and Amaro 2009	Case series	262, all female	Not specified	MBRP-W	None	Clients indicated high levels of satisfaction with the program.	NA	NA
van den Bosch et al. 2002	RCT	58, all female with BPD, 31 with SUD	AOD	DBT	Not specified	No sig. difference between DBT and TAU on substance abuse.	18-month follow-up: no sig. difference between posttreatment scores and follow-up scores.	NA
Vieten et al. 2010	Case series	33, 39 % female	Alcohol	Acceptance-based coping for relapse prevention	None	Significant decreases in craving, reactivity, stress. Significant increases in positive affect, mindfulness, psychological well-being.	6-month post-enrollment follow-up: no sig. change in percent days abstinent from post-intervention.	NA
Wikiewicz and Bowen 2010	RCT	See Bowen et al. 2009	AOD	MBRP	TSF, process-oriented format (standard outpatient care)	Craving mediated relationship between depression and substance use in the TSF group, but not in the MBRP group.	4-month follow-up: all MBRP plus who practiced meditation were abstinent regardless of depression scores.	Gender not a significant predictor of days of use, post-intervention depression scores, or craving.
Zgierska et al. 2008	Case series	19, 53 % women	Alcohol	Mindfulness meditation relapse prevention	None	Significant decrease in heavy drinking days and total number of drinks, but not percent days abstinent. Significant decrease in stress symptom severity and depression, though not craving.	16 weeks post-entry: overall change in total drinks did not reach significance over study period. Biological markers of stress (IL-6) decreased. All subjects reported meditating at home.	NA

Sig. significant, *alc.* alcohol, *BPD* borderline personality disorder, *Pts.* participants, *AOD* alcohol and other drugs, *TSF* 12-step format

case study (Batten and Hayes 2005), one was a pilot study that collected participant feedback (Vallejo and Amaro 2009), and one was of qualitative design (Beitel et al. 2007). Of the RCTs, one comparing DBT-SA to alternative mental health counselors found that participants in DBT-SA achieved significantly higher proportion of days abstinent both during the intervention and at a 16-month follow-up than the control group (Linehan et al. 1999). The second DBT-SA study used comprehensive validation therapy as a comparison group and found that, while DBT-SA was associated with lower rates of positive urinalysis during treatment and posttreatment, the differences were no longer significant at a 16-month follow-up (Linehan et al. 2002). The RCT examining standard DBT did not specify the comparison group beyond saying that it was treatment as usual and found no significant substance use differences between groups at posttreatment or at 18-month follow-up (van den Bosch et al. 2002). An additional case series used DBT-SA as an intervention and found that participants who completed the treatment demonstrated a decline in drug use and an increase in abstinence (Dimeff et al. 2000). Another case series studying standard DBT found significant reduction in pretreatment to posttreatment substance use (Axelrod et al. 2011). Two case series used 3-S as an intervention, and both found a decrease in drug use (Avants et al. 2005; Amaro et al. 2010). The pilot study by Vallejo and Amaro (2009) adapted MBRP for women who had experienced trauma and found that the clients reported satisfaction with the program. Finally, a qualitative study examining female participants in 3-S found that participants reported improved interpersonal functioning that they believed was due to the intervention (Beitel et al. 2007).

Male Populations

A total of three studies focused only on male populations, all of them single-client case studies (Heffner et al. 2003; Marcotte et al. 2003; Singh et al. 2011). One case study using ACT found that the client achieved abstinence and lower symptom distress by the end of the year, but not lower interpersonal distress (Heffner et al. 2003). In a case study using 3-S, the client achieved the outcome of cocaine-free urinalysis (Marcotte et al. 2003). Finally, in a case study examining a mindfulness-based smoking cessation intervention, the client achieved abstinence from tobacco at 3 months and maintained the abstinence throughout a 3-year follow-up (Singh et al. 2011). Though the results of each of these case studies are promising, more extensive research is needed on the effectiveness of mindfulness-based interventions for substance use in male-only populations.

Acceptance and Commitment Therapy

ACT encourages clients to identify their values, choose goals based on those values, and use mindfulness in order

to accept internal experiences that the client may perceive as aversive or as impediments to those goals (Hayes et al. 2004). Seven studies were found that used ACT as an intervention. Three of these studies were RCTs (Gifford et al. 2004; Hayes et al. 2004; Smout et al. 2010), three were case studies (Heffner et al. 2003; Batten and Hayes 2005; Twohig et al. 2007), and one was a case series (Luoma et al. 2008). Two of the RCTs comparing ACT to a 12-step intervention found no significant difference in substance use at posttreatment, but significantly less substance use in the ACT group at follow-up (Gifford et al. 2004; Hayes et al. 2004). The third RCT compared ACT to CBT and found that only CBT had significant improvements using hair analysis during treatment, and at follow-up, only CBT reached significance for increase in perceived negative consequences of substance use (Smout et al. 2010). All three case studies reported abstinence upon termination of intervention (Heffner et al. 2003; Batten and Hayes 2005; Twohig et al. 2007), though one case study of three participants found that two out of three had resumed substance use at follow-up (Twohig et al. 2007) and another found that the client resumed occasional drinking and marijuana use, but not regular cocaine or methamphetamine use, over follow-up (Batten and Hayes 2005). The case series did not examine changes in substance use, but did find that participation was associated with decreases self-stigma, shame, and experiential avoidance and increases in social support and self-esteem (Luoma et al. 2008). Therefore, ACT appears to be more effective over the long term than 12-step-based interventions, but not more effective than CBT at reducing substance use.

Dialectical Behavior Therapy

DBT is a cognitive-behavioral-based approach that is used for the treatment of borderline personality disorder (BPD) (Linehan 1993). The standard DBT treatment has since been modified into DBT-SA, a form of therapy adapted for use with clients who have both BPD and SUD. In addition to distress tolerance skills, emotional regulation skills, and interpersonal effectiveness skills, clients are taught mindfulness skills in order to help them “surf their urges” for substance use (McMain et al. 2007). Five studies were found that examined DBT or DBT-SA for clients with both BPD and SUD. Two of these studies are case series (Dimeff et al. 2000; Axelrod et al. 2011) and three are RCTs (Linehan et al. 1999, 2002; van den Bosch et al. 2002). Both case series found that drug use declined over the course of treatment (Dimeff et al. 2000; Axelrod et al. 2011). One RCT compared DBT-SA to alternative mental health counselors and found that participants in the DBT condition had a significantly higher proportion of alcohol and drug abstinent days over the year of treatment and at the

16-month follow-up (Linehan et al. 1999). Another RCT compared DBT-SA to comprehensive validation therapy with a 12-step component and found that, while participants in the DBT-SA condition had a lower proportion of opiate-positive urinalysis at 1 year, by 16 months, there was no significant difference in urinalysis between conditions and both conditions had a low proportion of positive urinalysis (Linehan et al. 2002). Finally, an RCT that compared standard DBT to treatment as usual found that, while DBT was more effective than treatment as usual at reducing severe BPD symptoms, neither condition was effective at reducing substance use (van den Bosch et al. 2002). Therefore, DBT-SA holds promise as a treatment for concurrent SUD and BPD, while there is less evidence to support the use of standard DBT as an intervention for decreasing substance use.

Mindfulness-Based Stress Reduction

Mindfulness-based stress reduction (MBSR) provides instruction in mindfulness so that clients can increase their self-awareness and decrease their levels of stress in response to aversive internal and external experiences (Kabat-Zinn 2009). Two studies, both case series, examined MBSR for substance use (Bootzin and Stevens 2005; Davis et al. 2007). One study of adolescents found that MBSR improved sleep behaviors, but that drug use increased for all participants (Bootzin and Stevens 2005), while the other study found that 10 out of 18 participants achieved abstinence by a 6-week follow-up (Davis et al. 2007). The research is not sufficient in quantity or quality to draw conclusions regarding MBSR and substance use.

Mindfulness-Based Cognitive Therapy

MBCT was originally developed for the treatment of depression and depressive relapse and combined aspects of MBSR with elements of traditional cognitive therapy (Segal et al. 2002). All three studies examining MBCT used a modified form of the intervention in order to best suit the population. One case series examined individuals with binge eating disorder and SUD and found that the intervention was related to lower addiction severity (Courbasson et al. 2011). Another quasi-experimental study examined a population in a treatment community and found that individuals in the mindfulness therapy had overall lower cortisol levels (Marcus et al. 2009). Finally, a case study for a tobacco user found that the client achieved tobacco abstinence and maintained it for 3 years (Singh et al. 2011).

Mindfulness-Based Relapse Prevention

MBRP combines elements of traditional relapse prevention with MBCT and MBSR (Bowen et al. 2009, 2011). The

therapy teaches clients mindfulness skills so that they might increase their self-awareness during situations that are of high risk for relapse and enhance their coping skills and self-efficacy in such situations (Bowen et al. 2009). Five papers based on four studies examined MBRP and substance use. Out of two RCTs, one compared MBRP to a 12-step intervention (Bowen et al. 2009; Witkiewitz and Bowen 2010). The authors of this study found that while MBRP had significantly greater decreases in alcohol and drug use, the group differences were no longer significant at a 4-month follow-up (Bowen et al. 2009). A second publication on the same original study found that level of craving mediated the relationship between depression and substance use in the 12-step group, but not in the MBRP group, and that all participants who practiced meditation at the follow-up assessment were abstinent regardless of their depression level (Witkiewitz and Bowen 2010). The second RCT compared MBRP to CBT and found no significant differences between treatments for drug or alcohol use, though individuals in MBRP had attenuated anxiety responses to laboratory-induced conditions (Brewer et al. 2009). One pilot study adapted MBRP for women with trauma and measured client satisfaction and responses to the group (Vallejo and Amaro, 2009). Finally, a case series found that MBRP was related to decreases in depression, drinking days, and total drinks, but not in abstinence. In addition, at follow-up, overall change in total drinks did not reach significance (Zgierska et al. 2008).

Vipassanā Meditation

VM courses more overtly make reference to Buddhism than other types of mindfulness interventions. They teach participants mindful meditation as well as Buddhist views of suffering, craving, and addiction (Bowen et al. 2006). There are three papers based on one parent study of VM. Two papers based on one parent quasi-experimental study on a prison population found that VM participation was related to lower drug and alcohol use at follow-up and less avoidance of thoughts (Bowen et al. 2006, 2007). A later publication based on the same original study compared VM to chemical dependency and mental health services and found that VM predicted lower substance use at posttreatment and follow-up and that severity of posttraumatic stress did not mediate treatment outcome (Simpson et al. 2007).

Spiritual Self-Schema

3-S therapy was developed for individuals with an SUD who are also at risk for developing or spreading HIV (Margolin et al. 2006). The therapy uses mindfulness training in order to teach clients to recognize patterns of the mind that cause suffering and that form the “addict self-schema.”

Through the therapy, clients begin to identify less with their addict self and more with their “true self,” the “spiritual self-schema” (Avants and Margolin 2004; Margolin et al. 2006). A total of six studies were reviewed that use 3-S as an intervention. One RCT compared 3-S to methadone maintenance and found that participants in 3-S were less likely to engage in HIV risk behavior and identified less with their “addict self-schemas” (Margolin et al. 2006). Two case series reported decreases in drug use after a course of 3-S treatment (Avants et al. 2005; Amaro et al. 2010). One quasi-experimental study found that, compared to methadone maintenance, 3-S was associated with decreased drug use (Margolin et al. 2007). One case study found that 3-S resulted in cocaine-free urinalysis (Marcotte et al. 2003). Finally, a qualitative study found that clients appreciated how 3-S did not lecture them and that they believed the meditation component would help them in the future (Beitel et al. 2007).

Discussion

The single RCT study that examined gender differences in the effectiveness of mindfulness-based therapy for SUD failed to find significant effects of gender (Bowen et al. 2009; Witkiewitz and Bowen 2010), though it may have lacked sufficient power to detect gender differences of smaller effect sizes. Equally, a number of quasi-experimental studies and case series did find that women gravitated more towards MBTs or that women may have benefitted more from the said treatments (Simpson et al. 2007; Britton et al. 2010; Chen et al. 2010). Overall, more research with sufficient power to detect small gender differences needs to be conducted in order to form a more definite conclusion about the role of gender in MBTs for SUD.

Four of the papers included in this review compared MBTs to 12-step format (TSF) interventions and found that the MBTs were either equal or superior to the 12-step treatments for increasing abstinence (Alterman et al. 2004; Bowen et al. 2009; Hayes et al. 2004; Witkiewitz and Bowen 2010). Two studies compared MBTs to CBT, and one found them equally effective (Brewer et al. 2009), though the other found that only CBT had significant improvements using hair analysis (Smout et al. 2010). Overall, though the quality of research differs, each type of MBT reviewed in this paper was found to be effective at reducing substance use. However, a number of the studies reviewed in this paper failed to include follow-up measurement of outcome variables, weakening our ability to infer the long-term effectiveness of MBT for substance use.

One possible future direction for research on MBT and substance misuse is integration with trauma-focused

interventions. The rates of trauma and posttraumatic stress disorder (PTSD) are precipitously high among individuals with SUD, especially women, and numerous researchers have argued that integrated rather than sequential treatment of SUD and PTSD is the most effective treatment route (Evans and Sullivan 1995; Najavits 2002; Bollerud 1990). Though less research exists on the use of MBTs for trauma than for SUD, there is reason to believe that MBT might be a promising treatment for complex trauma and PTSD (Becker and Zayfert 2001; Wagner and Linehan 2006). For example, MBT would address avoidance of painful thoughts and experiences and emotional numbing, two main symptoms of PTSD and the experience of trauma (Follette et al. 2006; Orsillo and Batten 2005). Equally, it has been found that trait mindfulness is negatively correlated with PTSD symptoms and depersonalization among individuals who have experienced trauma (Vujanovic et al. 2009). However, it is also possible that some mindfulness exercises, such as breathing exercises or certain yoga positions, could be triggering for individuals who have experienced particular types of interpersonal violence (Vallejo and Amaro 2009); therefore, it is important that the MBT therapist be vigilant and cautious in leading the exercises and that clients be empowered to take control of their own treatment and recognize when they need to step back from an exercise. As of yet, few studies have examined MBT for trauma; however, a number of case studies, case series, and a quasi-experimental study have found it to be an effective treatment (Blevins et al. 2011; Twohig 2009; Batten and Hayes 2005; Vallejo and Amaro 2009). In this literature review, two studies measured both SUD and PTSD symptoms. The first, a study of VM for incarcerated individuals with SUD and PTSD, found a decrease in substance use but not trauma symptoms (Simpson et al. 2007); however, PTSD symptom severity did not influence treatment outcome for substance use. The second, a case series of an integrated MBRP treatment designed for women with both trauma symptoms and SUD found that women reported finding the treatment helpful and useful, but did not report symptom outcome (Vallejo and Amaro 2009). Thus, additional research is needed on ways of integrated MBTs for substance use with trauma-focused interventions.

Though the review seems to suggest that MBTs are equally effective for both genders, there may be ways of additionally tailoring the treatments for women and men. For example, the treatments could include discussions regarding the influence of gender roles on the participant's lives and substance use. Indeed, mindfulness practice may be a means of alleviating the influence of oppressive and harmful gender role self-schemas. Women's proscribed gender role includes the belief in the importance of being attractive, being unselfish and putting others' needs before

one's own, and avoiding complaining (Toner et al. 2012). In an article on self-schemas of African-American women and their relationship to health, Woods-Giscombe and Black (2010) describe the “superwoman schema” and the “strong black woman script,” schemas that value self-sacrifice, self-silencing, and emotional suppression. Because of its emphasis on nonjudgmental acceptance of internal experiences rather than attempts at their suppression, mindfulness practice works against the urge to self-censor or suppress one's needs. Instead, those who practice mindfulness may be more aware of internal pain or stress and more inclined to practice self-care (Woods-Giscombe and Black 2010). Some of the treatments reviewed already have an empowerment component. For example, 3-S therapy encourages clients to identify with the best aspects of themselves and decrease their amount of self-stigmatization.

Knowing the high rates of trauma among individuals with SUD, another possible way of tailoring the intervention for individuals of each gender is to have male-only and female-only groups. Research has suggested that women in particular may feel more comfortable joining women-only treatment groups, though the influence of same-gender treatment on results is mixed (Greenfield et al. 2007). In this review, the majority of interventions were mixed gender.

There are a number of limitations to this paper. Only articles published in English could be included in this paper, limiting the potential scope of the review. As well, no unpublished articles were included, leading the review to be susceptible to publication bias. Many of the studies included in this review did not mention gender in their findings, which could possibly be due to a lack of gender effect rather than to gender not being included as a research variable. Equally, a number of studies that did include gender as a variable did not publish their power analysis, thus making it difficult to ascertain if the studies had sufficient power to detect gender effects of small effect sizes. Another possible limitation is the lack of differentiation between studies that examined illegal substance use, studies that focused on alcohol, and studies that focused on tobacco. Despite the different social contexts surrounding these substances, a number of studies examined polysubstance use or use of both alcohol and other drugs; thus, for the purpose of this review, no differentiation was made in the results between types of substance use. Finally, no coding measure was used in order to rank the quality of the research studies included in the review and no information on effect sizes has been provided. Despite the limitations, this review possesses a number of strengths. To the best of our knowledge, it is the only review to look systematically at gender differences in MBTs. This systematic review has thus been

able to point out gaps in the literature and identify future areas for mindfulness-based research.

Conclusion

Evidence suggests promise for the use of mindfulness-based interventions in the treatment of SUDs. However, a limited number of papers have examined the existence of gender differences in the effectiveness and efficacy of MBTs. Based on the small amount of existing literature, this review suggests that more rigidly designed studies failed to find effects of gender on the effectiveness of MBTs, though some non-controlled studies have found evidence of greater effectiveness for women. More research is needed on the relationship between MBTs and gender.

References

- Alterman, A. I., Koppenhaver, J. M., Mulholland, E., Ladden, L. J., & Baime, M. J. (2004). Pilot trial of effectiveness of mindfulness meditation for substance abuse patients. *Journal of Substance Use, 9*, 259–268. doi:10.1080/1465890410001711698.
- Amaro, H., Magno-Gatmaytan, C., Meléndez, M., Coréts, D. E., Arevalo, S., & Margolin, A. (2010). Addiction treatment intervention: An uncontrolled prospective pilot study of spiritual self-schema therapy with Latina women. *Substance Abuse, 31*(2), 117–125. doi:10.1080/08897071003641602.
- Appel, J., & Kim-Appel, D. (2009). Mindfulness: Implications for substance abuse and addiction. *International Journal of Mental Health and Addiction, 7*(4), 506–512. doi:10.1007/s11469-009-9199-z.
- Avants, S. K., Beitel, M., & Margolin, A. (2005). Making the shift from ‘addict self’ to ‘spiritual self’: Results from a stage I study of spiritual self-schema (3-S) therapy for the treatment of addiction and HIV risk behavior. *Mental Health, Religion and Culture, 8*(3), 167–177. doi:10.1080/13694670500138924.
- Avants, S. K., & Margolin, A. (2004). Development of spiritual self-schema (3-S) therapy for the treatment of addictive and HIV risk behavior: A convergence of cognitive and Buddhist psychology. *Journal of Psychotherapy Integration, 14*(3), 253–289. doi:10.1037/1053-0479.14.3.253.
- Axelrod, S. R., Pereplechikova, F., Holtzman, K., & Sinha, R. (2011). Emotion regulation and substance use frequency in women with substance dependence and borderline personality disorder receiving dialectical behavior therapy. *The American Journal of Drug and Alcohol Abuse, 37*(1), 37–42.
- Batten, S. V., & Hayes, S. C. (2005). Acceptance and commitment therapy in the treatment of comorbid substance abuse and post-traumatic stress disorder: A case study. *Clinical Case Studies, 4*(3), 246–262. doi:10.1177/1534650103259689.
- Becker, C. B., & Zayfert, C. (2001). Integrating DBT-based techniques and concepts to facilitate exposure treatment for PTSD. *Cognitive and Behavioral Practice, 8*, 107–122. doi:10.1016/S1077-7229(01)80017-1.
- Beitel, M., Genova, M., Schuman-Olivier, Z., Arnold, R., Avants, S. K., & Margolin, A. (2007). Reflections by inner-city drug users on a Buddhist-based spirituality-focused therapy: A qualitative study. *The American Journal of Orthopsychiatry, 77*(1), 1–9. doi:10.1037/0002-9432.77.1.1.
- Berlin, I., Singleton, E. G., Pedarriosse, A., Lancrenon, S., Rames, A., Aubin, H., & Niaura, R. (2003). The modified reasons for smoking

- scale: Factorial structure, gender effects and relationship with nicotine dependence and smoking cessation in French smokers. *Addiction*, 98(11), 1575–1583. doi:10.1046/j.1360-0443.2003.00523.x.
- Blevins, D., Roca, J. V., & Spencer, T. (2011). Life guard: Evaluation of an ACT-based workshop to facilitate reintegration of OIF/OEF veterans. *Professional psychology: Research and practice*, 42, 32–39. doi:10.1037/a0022321.
- Bollerud, K. (1990). A model for the treatment of trauma-related syndromes among chemically dependent inpatient women. *Journal of Substance Abuse Treatment*, 7, 83–87. doi:10.1016/0740-5472(90)90003-9.
- Bootzin, R. R., & Stevens, S. J. (2005). Adolescents, substance abuse, and the treatment of insomnia and daytime sleepiness. *Clinical Psychology Review. Special Issue: Insomnia and Behavioral Sleep Medicine*, 25(5), 629–644. doi:10.1016/j.cpr.2005.04.007.
- Bowen, S., Chawla, N., Collins, S. E., Witkiewitz, K., Hsu, S., Grow, J., Clifasefi, S., et al. (2009). Surfing the urge: Brief mindfulness-based intervention for college student smokers. *Psychology of Addictive Behaviors*, 23(4), 666–671. doi:10.1037/a0017127.
- Bowen, S., Chawla, N., & Marlatt, G. A. (2011). *Mindfulness-based relapse prevention for addictive behaviors: A clinician's guide*. New York: Guilford.
- Bowen, S., Witkiewitz, K., Dillworth, T. M., Chawla, N., Simpson, T. L., Ostafin, B. D., et al. (2006). Mindfulness meditation and substance use in an incarcerated population. *Psychology of Addictive Behaviors*, 20(3), 343–347. doi:10.1037/0893-164X.20.3.343
- Bowen, S., Witkiewitz, K., Dillworth, T. M., & Marlatt, G. A. (2007). The role of thought suppression in the relationship between mindfulness mediation and alcohol use. *Addictive Behaviors*, 32(10), 2324–2328. doi:10.1016/j.addbeh.2007.01.025.
- Brady, K. T., & Randall, C. L. (1999). Gender differences in substance use disorders. *Addictive Disorders*, 22, 241–252.
- Breslin, F. C., Zack, M., & McMains, S. (2002). An information-processing analysis of mindfulness: Implications for relapse prevention in the treatment of substance abuse. *Clinical Psychology: Science and Practice*, 9, 275–299. doi:10.1093/clipsy/9.3.275.
- Brewer, J. A., Sinha, R., Chen, J. A., Michalsen, R. N., Babuscio, T. A., Nich, C., et al. (2009). Mindfulness training and stress reactivity in substance abuse: Results from a randomized, controlled stage I pilot study. *Substance Abuse*, 30(4), 306–317. doi:10.1080/08897070903250241
- Britton, W. B., Bootzin, R. R., Cousins, J. C., Hasler, B. P., Peck, T., & Shapiro, S. L. (2010). The contribution of mindfulness practice to a multicomponent behavioral sleep intervention following substance abuse treatment in adolescents: A treatment-development study. *Substance Abuse*, 31(2), 86–97. doi:10.1080/08897071003641297.
- Chen, K. W., Comerford, A., Shinnick, P., & Ziedonis, D. M. (2010). Introducing *qigong* meditation into residential addiction treatment: A pilot study where gender makes a difference. *Journal of Alternative and Complementary Medicine*, 16(8), 875–882. doi:10.1089/acm.2009.0443.
- Chiesa, A., & Malinowski, P. (2011). Mindfulness-based approaches: Are they all the same? *Journal of Clinical Psychology*, 67, 404–424. doi:10.1002/jclp.20776
- Courbasson, C. M., Nishikawa, Y., & Shapira, L. B. (2011). Mindfulness-action based cognitive behavioral therapy for concurrent binge eating disorder and substance use disorders. *Eating Disorders: The Journal of Treatment & Prevention. Special Issue: Eating Disorders and Mindfulness*, 19(1), 17–33. doi:10.1080/10640266.2011.533603.
- Dakwar, E., Mariani, J. P., & Levin, F. R. (2011). Mindfulness impairments in individuals seeking treatment for substance use disorders. *The American Journal of Drug and Alcohol Abuse*, 37, 165–169. doi:10.3109/00952990.2011.553978.
- Davis, J. M., Fleming, M. F., Bonus, K. A., & Baker, T. B. (2007). A pilot study on mindfulness based stress reduction for smokers. *BMC Complementary and Alternative Medicine*, 7. doi:10.1186/1472-6882-7-2.
- de Graaf, R., Bijl, R. V., Smit, F., Vollebergh, W. A. M., & Spijker, J. (2002). Risk factors for 12-month comorbidity of mood, anxiety, and substance use disorders: Findings from the Netherlands Mental Health Survey and Incidence Study. *The American Journal of Psychiatry*, 159, 620–629.
- Dimeff, L., Rizvi, S. L., Brown, M., & Linehan, M. M. (2000). Dialectical behavior therapy for substance abuse: A pilot application to methamphetamine-dependent women with borderline personality disorder. *Cognitive and Behavioral Practice*, 7(4), 457–468. doi:10.1016/S1077-7229(00)80057-7.
- Evans, K., & Sullivan, J. M. (1995). *Treating addicted survivors of trauma*. New York: Guilford Press.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analysis using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149–1160. doi:10.3758/BRM.41.4.1149.
- Follette, F., Palm, K. M., & Pearson, A. N. (2006). Mindfulness and trauma: Implications for treatment. *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, 24, 45–61. doi:10.1007/s10942-006-0025-2.
- Garland, E. L., Gaylord, S. A., Boettiger, C. A., & Howard, M. O. (2010). Mindfulness training modifies cognitive, affective, and physiological mechanisms implicated in alcohol dependence: Results of a randomized controlled pilot trial. *Journal of Psychoactive Drugs*, 42, 177–192.
- Gifford, E. V., Kohlenberg, B. S., Hayes, S. C., Antonuccio, D. O., Piasecki, M. M., Rasmussen-Hall, M. L., & Palm, K. M. (2004). Acceptance-based treatment for smoking cessation. *Behavior Therapy*, 35, 589–705. doi:10.1016/S0005-7894(04)80015-7.
- Goldin, P. R., & Gross, J. J. (2010). Effects of mindfulness-based stress reduction (MBSR) on emotion regulation in social anxiety disorder. *Emotion*, 10, 83–91. doi:10.1037/a0018441.
- Greenfield, S. F., Back, S. E., Lawson, K., & Brady, K. T. (2010). Substance abuse in women. *Psychiatric Clinics in North America*, 33, 339–355. doi:10.1016/j.psyc.2010.01.004.
- Greenfield, S. F., Brooks, A. J., Gordon, S. M., Green, C. A., Kropp, F., McHugh, R. K., et al. (2007). Substance abuse treatment entry, retention, and outcome in women: A review of the literature. *Drug and Alcohol Dependence*, 86, 1–21. doi:10.1016/j.drugalcdep.2006.05.012.
- Gutierrez, S. E., & Todd, M. (1997). The impact of childhood abuse on treatment outcomes of substance users. *Professional Psychology: Research and Practice*, 28, 348–354. doi:10.1037/0735-7028.28.4.348.
- Hayes, S. C., Wilson, K. G., Gifford, E. V., Bissett, R., Piasecki, M., Batten, S. V., et al. (2004). A preliminary trial of twelve-step facilitation and acceptance and commitment therapy with polysubstance-abusing methadone-maintained opiate addicts. *Behavior Therapy*, 35(4), 667–688. doi:10.1016/S0005-7894(04)80014-5
- Heffner, M., Eifert, G. H., Parker, B. T., Hernandez, D. H., & Sperry, J. A. (2003). Valued directions: Acceptance and commitment therapy in the treatment of alcohol dependence. *Cognitive and Behavioral Practice*, 10(4), 378–383. doi:10.1016/S1077-7229(03)80055-X.
- Hsu, S. H., Grow, J., & Marlatt, G. A. (2009). Mindfulness and addiction. In M. Galanter & L. Kaskutas (Eds.), *Research on Alcoholics Anonymous and spirituality in addiction recovery* (pp. 229–250). New York: Springer Science & Business Media.
- Kabat-Zinn, J. (2005). *Coming to our senses: Healing ourselves and the world through mindfulness*. New York: Hyperion.
- Kabat-Zinn, J. (2009). *Full catastrophe living*. New York: Delta.
- King, A. C., Bernardy, N. C., & Hauner, K. (2003). Stressful events, personality, and mood disturbance: Gender differences in alcoholics and problem drinkers. *Addictive Behaviors*, 28, 171–187. doi:10.1016/S0306-4603(01)00264-7.

- Linehan, M. M. (1993). *Cognitive-behavioural treatment of borderline personality disorder*. New York: Guilford.
- Linehan, M. M., Dimeff, L. A., Reynolds, S. K., Comtois, K. A., Welch, S. S., Heagerty, P., & Kivlahan, D. R. (2002). Dialectical behavior therapy versus comprehensive validation therapy plus 12-step for the treatment of opioid dependent women meeting criteria for borderline personality disorder. *Drug and Alcohol Dependence*, 67(1), 13–26. doi:10.1016/S0376-8716(02)00011-X.
- Linehan, M. M., Schmidt, H., III, Dimeff, L. A., Craft, J. C., Kanter, J., & Comtois, K. A. (1999). Dialectical behavior therapy for patients with borderline personality disorder and drug-dependence. *The American Journal on Addictions*, 8(4), 279–292. doi:10.1080/105504999305686.
- Luoma, J. B., Kohlenberg, B. S., Hayes, S. C., Bunting, K., & Rye, A. K. (2008). Reducing self-stigma in substance abuse through acceptance and commitment therapy: Model, manual development, and pilot outcomes. *Addiction Research & Theory*, 16(2), 149–165. doi:10.1080/16066350701850295.
- Marcotte, D., Avants, S. K., & Margolin, A. (2003). Spiritual self-schema therapy, drug abuse, and HIV. *Journal of Psychoactive Drugs*, 35(3), 389–391.
- Marcus, M. T., Schmitz, J., Moeller, G., Liehr, P., Cron, S. G., Swank, P., et al. (2009). Mindfulness-based stress reduction in therapeutic community treatment: A stage 1 trial. *The American Journal of Drug and Alcohol Abuse*, 35(2), 103–108. doi:10.1080/00952990902823079
- Margolin, A., Beitel, M., Schuman-Olivier, Z., & Avants, S. K. (2006). A controlled study of a spirituality-focused intervention for increasing motivation for HIV prevention among drug users. *AIDS Education and Prevention*, 18(4), 311–322. doi:10.1521/aeap.2006.18.4.311.
- Margolin, A., Schuman-Olivier, Z., Beitel, M., Arnold, R. M., Fulwiler, C. E., & Avants, S. K. (2007). A preliminary study of spiritual self-schema (3-S⁺) therapy for reducing impulsivity in HIV-positive drug users. *Journal of Clinical Psychology. Special Issue: Spirituality and Psychotherapy*, 63(10), 979–999. doi:10.1002/jclp.20407.
- Marlatt, G. A., & Chawla, N. (2007). Meditation and alcohol use. *Southern Medical Journal*, 100, 451–454.
- McMain, S., Sayers, J. H. R., Dimeff, L. A., & Linehan, M. M. (2007). Dialectical behavior therapy for individuals with borderline personality disorder and substance dependence. In L. A. Dimeff & K. Korner (Eds.), *Dialectical behavior therapy in clinical practice: Applications across disorders and settings* (pp. 145–173). New York: Guilford.
- Najavits, L. M. (2002). *Seeking safety: a treatment manual for PTSD and substance abuse*. New York: Guilford Press.
- Olenick, N. L., & Chalmers, D. K. (1991). Gender specific drinking styles in alcoholics and nonalcoholics. *Journal of Studies on Alcohol*, 52, 325–330.
- Orsillo, S. M. & Batten, S. V. (2005). Acceptance and commitment therapy in the treatment of Posttraumatic stress disorder. *Behavior Modification*, 29, 95–129. doi:10.1177/0145445504270876.
- Palfai, T. P., Monti, P. M., Colby, S. M., & Rohsenow, D. J. (1997). Effects of suppressing the urge to drink on the accessibility of alcohol outcome expectancies. *Behaviour Research and Therapy*, 35, 58–65. doi:10.1016/S0005-7967(96)00079-4.
- Rubonis, A. V., Colby, S. M., Monti, P. M., Rohsenow, D. J., Gulliver, S. B., & Sirota, A. D. (1994). Alcohol cue reactivity and mood induction in male and female alcoholics. *Journal of Studies on Alcohol*, 55, 487–494.
- Salkovskis, P. M., & Reynolds, M. (1994). Thought suppression and smoking cessation. *Behaviour Research and Therapy*, 32, 193–201. doi:10.1016/0005-7967(94)90112-0.
- Saunders, J. B., Davis, M., & Williams, R. (1981). Do women develop alcoholic liver disease more readily than men? *British Medical Journal*, 282, 1140–1143.
- Schneider, K. M., Kviz, F. J., Isola, M. L., & Filstead, W. J. (1995). Evaluating multiple outcomes and gender differences in alcoholism treatment. *Addictive Behaviors*, 20, 1–21. doi:10.1016/0306-4603(94)00037-Y.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. New York: Guilford.
- Shapiro, S. L., Brown, K. W., & Biegel, G. M. (2007). Teaching self-care to caregivers: Effects of mindfulness-based stress reduction on the mental health of therapists in training. *Training and Education in Professional Psychology*, 1, 105–115. doi:10.1037/1931-3918.1.2.105.
- Simpson, T. L., Kaysen, D., Bowen, S., MacPherson, L. M., Chawla, N., Blume, A., Marlatt, G. A., Larimer, M. (2007). PTSD symptoms, substance use, and vipassana meditation among incarcerated individuals. *Journal of Traumatic Stress*, 20(3), 239–249. doi:10.1002/jts.20209
- Simpson, T. L. & Miller, W. R. (2002). Concomitance between childhood sexual and physical abuse and substance use problems: a review. *Clinical Psychology Review*, 22, 27–77. doi:10.1016/S0272-7358(00)00088-X.
- Singh, N. N., Lancioni, G. E., Winton, A. S. W., Singh, A. N. A., Singh, J., & Singh, A. D. A. (2011). Effects of a mindfulness-based smoking cessation program for an adult with mild intellectual disability. *Research in Developmental Disabilities*, 32(3), 1180–1185. doi:10.1016/j.ridd.2011.01.003.
- Smout, M. F., Longo, M., Harrison, S., Minniti, R., Wickes, W. & White, J. M. (2010). Psychosocial treatment for methamphetamine use disorders: a preliminary randomized controlled trial of cognitive behavior therapy and acceptance and commitment therapy. *Substance Abuse*, 31, 98–107. doi:10.1080/08897071003641578.
- Sun, A. (2007). Relapse among substance-abusing women: Components and processes. *Substance Use & Misuse*, 42(1), 1–21. doi:10.1080/10826080601094082.
- Toll, B. A., Sobell, M. B., Wagner, E. F., & Sobell, L. C. (2001). The relationship between thought suppression and smoking cessation. *Addictive Behaviors*, 26, 509–515.
- Toner, B., Tang, T., Ali, A., Akman, D., Stuckless, N., Esplen, M. J., Rolin-Gilman, C., & Ross, L. (2012). Developing a gender role socialization scale. In J. L. Oliffe & L. Greaves (Eds.), *Designing and conducting gender, sex, & health research*. Los Angeles: Sage. 189–200.
- Twohig, M. P. (2009). Acceptance and commitment therapy for treatment-resistant posttraumatic stress disorder: a case study. *Cognitive and Behavioral Practice*, 16, 243–252. doi:10.1016/j.cbpra.2008.10.002.
- Twohig, M. P., Shoenberger, D., & Hayes, S. C. (2007). A preliminary investigation of acceptance and commitment therapy as a treatment for marijuana dependence in adults. *Journal of Applied Behavior Analysis*, 40(4), 619–632.
- Vallejo, Z. & Amaro, H. (2009). Adaptation of mindfulness-based stress reduction program for addiction relapse prevention. *The Humanistic Psychologist*, 37, 192–206. doi:10.1080/088732609028922987.
- van den Bosch, L. M. C., Verheul, R., Schippers, G. M., & van den Brink, W. (2002). Dialectical behavior therapy of borderline patients with and without substance use problems: Implementation and long-term effects. *Addictive Behaviors. Special Issue: Integration Substance Abuse Treatment and Prevention in the Community*, 27(6), 911–923. doi:10.1016/S0306-4603(02)00293-9.
- Vieten, C., Astin, J. A., Buscemi, R. & Galloway, G. P. (2010). Development of an acceptance-based coping intervention for alcohol dependence relapse prevention. *Substance Abuse*, 31, 108–116. doi:10.1080/0889707/1003641594.
- Vujanovic, A. A., Youngwirth, N. E., Johnson, K. A., & Zvolensky, M. J. (2009). Mindfulness-based acceptance and posttraumatic stress symptoms among trauma-exposed adults without axis I psychopathology. *Journal of Anxiety Disorders*, 23, 297–303. doi:10.1016/j.janxdis.2008.08.005.

- Wagner, A., & Linehan, M. M. (2006). Applications of dialectical behavior therapy to posttraumatic stress disorder and related problems. In V. M. Follette (Ed.), *Cognitive-behavioral therapies for trauma* (second ed., pp. 117–145). New York: Guilford.
- Walitzer, K. S., & Dearing, R. L. (2006). Gender differences in alcohol and substance use relapse. *Clinical Psychology Review, 26*(2), 128–148. doi:10.1016/j.cpr.2005.11.003.
- Ward, K. D., Klesges, R. C., Zbikowski, S. M., Bliss, R. E., & Garvey, A. J. (1997). Gender differences in the outcome of an unaided smoking cessation attempt. *Addictive Behaviors, 22*(4), 521–533. doi:10.1016/S0306-4603(96)00063-9.
- Witkiewitz, K., & Bowen, S. (2010). Depression, craving, and substance use following a randomized trial of mindfulness-based relapse prevention. *Journal of Consulting and Clinical Psychology, 78*(3), 362–374. doi:10.1037/a0019172.
- Woods-Giscombe, C. L. & Black, A. R. (2010). Mind-body interventions to reduce risk for health disparities related to stress and strength among African American women: The potential of mindfulness-based stress reduction, loving-kindness, and the NTU therapeutic framework. *Complementary Health Practice Review, 15*, 115–131. doi:10.1177/1533210110386776.
- Zgierska, A., Rabago, D., Zuelsdorff, M., Coe, C., Miller, M., & Fleming, M. (2008). Mindfulness meditation for alcohol relapse prevention: A feasibility pilot study. *Journal of Addiction Medicine, 2*(3), 165–173. doi:10.1097/ADM.0b013e31816f8546.
- Zilberman, M. L., Tavares, H., Blume, S. B., & el-Guebaly, N. (2003). Substance use disorders: Sex differences and psychiatric comorbidities. *Canadian Journal of Psychiatry, 48*, 5–15.
- Zywiak, W. H., Connors, G. J., Maisto, S. A., & Westerberg, V. S. (1996). Relapse research and the Reasons for Drinking Questionnaire: A factor analysis of Marlatt's relapse taxonomy. *Addiction, 91*, S121–S130.