

# Role of Yoga in Management of Substance-use Disorders: A Narrative Review

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**ABSTRACT**

Substance use disorders are comparable to chronic medical illnesses and have a chronic relapsing course. Despite being significant contributors to morbidity and mortality, limited treatment options exist. The current narrative review was aimed at providing an overview of yoga therapy in substance-use disorders and discuss the relevant methodological issues. Articles published in English language till May 2017 indexed with PubMed, PubMed central, and Google Scholar were searched using search terms “Yoga,” “Substance use,” “Drug dependence,” “Nicotine,” “Tobacco,” “Alcohol,” “Opioids,” “Cannabis,” “Cocaine,” “Stimulants,” “Sedative hypnotics,” “Inhalants,” and “Hallucinogens” for inclusion in the review. A total of 314 studies were found fulfilling the stated criteria. Out of which, 16 studies were found to fulfill the inclusion and exclusion criteria and 12 were randomized control trials. The majority of studies were available on the role of yoga in management of nicotine dependence. Sample size of these studies ranged from 18 to 624. The majority of studies suggested the role of yoga in reducing substance use as well as substance-related craving (especially in nicotine-use disorders) in short term. However, more studies are required for demonstrating the long-term effects of yoga therapy in substance-use disorder.

**KEYWORDS:** *Hatha Yoga, substance-use disorders, Sudarshan Kriya Yoga, Vinyasa Yoga, Yoga*

## INTRODUCTION

Drug dependence is one of the most important issues of public health concern as it causes significant disability.<sup>[1]</sup> The International Classification of Disease-10<sup>th</sup> Edition defines drug dependence as a cluster of physiological, behavioral, and cognitive phenomena in which the use of a substance or a class of substances takes on a much higher priority for a given individual than other behaviors that once had a greater value.<sup>[2]</sup> Drug dependence causes impairment in various domains such as physical, psychological, social, occupational, legal, familial, and financial domains.

Despite various pharmacological measures for management of drug dependence, relapse is commonly encountered in clinical practice. In fact, drug dependence has been called a “chronic medical illness” with relapse rates of around 40%–60% which is comparable to relapse rate observed in diabetes mellitus

type I (30%–50%), hypertension, and asthma (50%–70% each).<sup>[3]</sup> With parallels being drawn between drug dependence and chronic medical illnesses and recognition of role of yoga in management of chronic medical illness, there has been an increase in focus on the role of traditional, complementary, and alternative forms of medicine, especially yoga in the management of drug dependence. This is of special relevance to the developing countries with limited human and monetary mental health resources and with relatively high social and cultural acceptance of yoga.<sup>[4]</sup>

Yoga, which is a form of mind–body practice, draws its roots to India and it has been proven to

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reduce perceived stress, anxiety, improve physical and mental health.<sup>[5]</sup> Yoga has eight components such as conduct within society, personal discipline, postures/poses (“asanas”), breathing, concentration, contemplation, meditation, and absorption/stillness.<sup>[6]</sup> Yoga in the management of drug dependence has been an intriguing area of interest since the last decade. Yoga is being considered as a holistic intervention inducing dopamine homeostasis leading to long-term benefits in management of addictive behaviors termed as “Reward Deficiency Syndrome.”<sup>[7]</sup> The present review attempts to review the available literature on the role of yoga in management of drug dependence.

## MATERIALS AND METHODS

### Study eligibility criteria used

Studies published in English language in peer-reviewed journal till May 2017 and which used any form of yoga-based interventions (except exclusive meditation based intervention) and had a defined quantitative physical or psychological outcome measures were screened for inclusion in the review.

### Search strategy

Literature search was conducted on PubMed, PubMed central, and Google Scholar for search terms “Yoga,” “Substance use,” “Drug dependence,” “Nicotine,” “Tobacco,” “Alcohol,” “Opioids,” “Cannabis,” “Cocaine,” “Stimulants,” “Sedative hypnotics,” “Inhalants,” and “Hallucinogens. Title and abstract as well as cross references were screened for their relevance before inclusion in the review. Unpublished data, including academic conference proceedings, are not included in the review. All the relevant literature was screened by the first and third author.

### Data synthesis and extraction

The data were extracted using a structured pro forma and were later organized into appropriate sections of each psychoactive substance synthesizing the literature on role of yoga in management of various substance-use disorders.

## RESULTS AND DISCUSSION

A total of 314 studies were found on literature search fulfilling the stated criteria. Out of which, 16 studies were found to be fulfilling the inclusion and exclusion criteria of our study. Out of these, 12 were randomized control trials (RCTs). Studies were available on the role of yoga in management of nicotine-use disorder, alcohol-use disorder, opioid-use disorder, and cocaine-use disorder. No studies were found on the role of yoga in management of cannabis, stimulants, sedative hypnotics, inhalants, and hallucinogens. The majority of studies were available on the role of yoga

in management of nicotine dependence. Sample size of these studies ranged from 18 to 624. Three studies were exclusively on female substance users.

### Yoga and nicotine-use disorders

Various pharmacological and nonpharmacological treatments have been tried in patients with nicotine-use disorders with limited outcome in the long-term basis. Exercise is known to benefit these patients as it not only reduces tobacco withdrawal and craving but also improves mood. Yoga, as a form of exercise, has been shown to promote subjective well-being and mood as well as adds to the desire to stop smoke.<sup>[8]</sup> As yoga is a multidimensional approach which includes elements of exercise, meditation, breathing work, as well as concentration, many researchers have tried yoga as a therapy in patients with nicotine-use disorders.<sup>[9]</sup> Table 1 provides the summary of the studies that assessed the effects of yoga in nicotine-use disorder.

An initial pre-post study done on twenty nicotine-use disorder patients studied effect of once weekly yoga (stretch and breath practice) sessions (for 5 weeks) reported significant change in motivation to quit among study participants, with majority of participants (65%) in a contemplation stage at the end of intervention.<sup>[8]</sup> Another study done on a larger sample ( $n = 82$ ) studied the effect of Sudarshan Kriya and Pranayama (delivered through a structured workshop spread over 6 days).<sup>[10]</sup> At the end of workshop, majority of participants (95%) reported that yoga helped them quit tobacco as they had a lesser craving when they practiced yoga. A total of 53/82 (65%) participants reported complete abstinence from tobacco during this period. Similarly, a small RCT conducted on 21 participants reported significant increase in mean self-control score to quit tobacco among intervention arm (i.e., 6 sessions of yoga spread over 6 weeks) after 6 weeks, while the same decreased in the control arm.<sup>[14]</sup> A more recent 3-arm RCT ( $n = 76$ ) compared effect of cardiovascular exercises and Hatha Yoga with nonactivity controls and reported a significant decrease in craving to smoke in both intervention arms as compared to control condition.<sup>[11]</sup> A RCT was conducted on 96 smokers using yoga breathing exercise (YBG) as an intervention arm and reported a significant difference in various craving measures in YBG as compared to video control group at immediate follow-up.<sup>[12]</sup> However, the difference was not observed post 24 h follow-up. Another study compared Vinyasa yoga with wellness group in a RCT done among 38 smokers and reported significantly lower 7-day point prevalence of abstinence in wellness group as compared to yoga group. Importantly, the difference was not observable at 3-month follow-up.<sup>[15]</sup>

**Table 1: Studies to assess the effect of yoga in nicotine-use disorders**

Study	Study design	Sample size	Intervention	Sessions	Follow-ups	Outcome measures	Results
McIver <i>et al.</i> , 2004 <sup>[4]</sup> Australia	Pre-post design	20 smokers	Yoga (stretch breath technique)	Once a week for 5 weeks	Every week for 5 weeks	Level of motivation	Posttest scores significantly higher than the pretest scores. 65% in contemplation stage during posttest
Kochupillai <i>et al.</i> , 2005 <sup>[6]</sup> India	Experimental	82 smokers + smokeless tobacco users	Sudarshan Kriya and Pranayam	AOL workshop -6 days	Day 6, week 2, and 3, month 2, and 6	Pattern and amount of tobacco	At day 6, 65% reported tobacco cessation and at 6 month, 17 persons reported cessation
Sharma and Corbin, 2006 <sup>[7]</sup> USA	Experimental	21 smokers	Behavioral yoga intervention	Lessons at the convenience	6 weeks and 6 months	Cigarettes smoked/day, self-efficacy, self-control	Significant increase in mean total self-control for quitting compared to control group
Elibero <i>et al.</i> , 2011 <sup>[8]</sup> USA	RCT	76 smokers	Hatha yoga versus. CE versus nonactivity control	Single session	20 min	Craving, cue reactivity	General decrease in craving in yoga group
Shahab <i>et al.</i> , 2013 <sup>[9]</sup> UK	RCT	96 smokers	YBG versus VCG groups	1 session on YBG	Immediate and post 24 h	Strength of urge, craving/desire to smoke	Significant reduction in all craving measures in YBG as compared to VCG No difference at 24 h
Gaskins <i>et al.</i> , 2015 <sup>[10]</sup> USA	RCT	38 male smokers	Vinyasa yoga group versus. Wellness group		7 days, 3 and 6 months	Feasibility Acceptability Abstinence	Wellness group men attended more classes Higher 7 day point prevalence of abstinence for the wellness group No significant difference at 3- and 6-month follow-up in terms of abstinence
Bock <i>et al.</i> , 2010 <sup>[11]</sup> USA	RCT	60 female smokers	Vinyasa yoga + CBT versus. Wellness + CBT program	Twice a week for eight consecutive weeks	7 days, 3 and 6 months	Point prevalence of abstinence	Greater abstinence at 3 and 6 months in yoga group
Bock <i>et al.</i> , 2012 <sup>[12]</sup> USA	RCT	55 smokers	8 weeks group based CBT with Hatha yoga or general health and wellness program	Twice weekly for 8 weeks	7 days, 3 and 6 months	Point prevalence of abstinence	Greater 7-day point prevalence of abstinence rates among yoga group than controls No difference at 6 months

Contd...

Table 1: Contd...

Study	Study design	Sample size	Intervention	Sessions	Follow-ups	Outcome measures	Results
Sidhu <i>et al.</i> , 2016 <sup>[13]</sup> India	Quasi-experimental design	624 students aged 16-18 years	Project EX (MET + coping skills activities)	8 session		Pre-post-measures of responsiveness	Significant preventive effect of the program  Yoga among the most likeable activities

RCT: Randomized controlled trial, USA: United States of America, UK: United Kingdom, CE: Cardiovascular exercise, YBG: Yoga breathing group, VCG: Video control group, MET: Motivational enhancement therapy, CBT: Cognitive-behavioral therapy, AOL: Art of living

In summary, the studies done on patients with nicotine-use disorders report positive effect of various yoga on self-reported abstinence rates as well as various craving measures at different time points during follow-up. However, the sustained effects of yoga on abstinence were not consistent among the above-mentioned studies. As many smokers use smoking as a strategy to reduce their anxiety level and yoga has been linked to improvement in mood, yoga can be an important way to manage anxiety among nicotine-use disorder patients (especially among smokers). Another mediational pathway could be the effect of yoga on stress as a study reported that 73% of participants took yoga therapy in order to manage their stress.<sup>[16]</sup>

### Special population – females

There have been relatively lesser studies on effects of yoga on female patients with nicotine-use disorders. Only two studies were identified which were done exclusively on female subjects. An RCT on sixty female smokers reported significant effect of Vinyasa Yoga along with cognitive-behavioral therapy (CBT) on nicotine use.<sup>[17]</sup> Yoga group had significantly greater abstinence rates at 3- and 6-month follow-up as compared to wellness group. However, a relatively more recent RCT done on a sample of 55 female smokers using 8-week group based CBT along with Hatha Yoga reported no difference in abstinence rates at 6-month follow-up between Yoga and control arm. However, the rates of 7-day point prevalence abstinence rates were higher in Yoga group.<sup>[18]</sup>

### Special population – adolescents

Only one study evaluated effect of yoga in adolescents' nicotine use. A study was conducted using a quasi-experimental design (project EX tobacco use prevention and cessation program) to assess tobacco use among 624 adolescent Indian students aged 16–18 years. Project EX involves motivational enhancement as well as coping skills (which involves complementary and alternative medicine such as yoga and meditation).<sup>[13]</sup> It was conducted using an 8-session classroom-based curriculum, involving two program and two control

schools. The study reported that compared to standard care controls, the EX program had a preventive effect on nicotine use. Importantly, yoga was rated as the most likeable along with meditation among all the activities. The study concluded that program involving yoga and meditation might be an effective preventive program for nicotine-use disorders among Indian adolescents.

### Yoga and alcohol-use disorders

A total of three studies (RCTs) have tried to assess the effect of yoga on outcomes of alcohol-use disorders. Initial study compared effect of Sudarshan Kriya Yoga with treatment as usual in sixty patients with alcohol-use disorders and reported a significant reduction in Beck Depression Inventory scores as well as plasma cortisol and adrenocorticotrophic hormone levels in patients who received Sudarshan Kriya Yoga therapy as compared to treatment as usual group.<sup>[19]</sup> A more recent study compared the effect of Yoga in comparison to treatment as usual and found no significant difference in alcohol consumption between two groups at 10-week follow-up.<sup>[20]</sup> However, the study findings are limited by small sample size ( $n = 18$ ). Another study done on 38 patients with posttraumatic stress disorder who consume alcohol compared effect of Kripalu-based Hatha Yoga with assessment only and found a significant reduction in the Alcohol Use Disorders Identification Test (AUDIT) and Drug Use Disorders Identification Test (DUDIT) in yoga group as the end of 12 sessions.<sup>[21]</sup> On the contrary, AUDIT and DUDIT scores increased in the control arm.

### Yoga and opioids-use disorders

Only three studies (all RCTs) have assessed role of yoga in treatment of opioid-use disorders. The initial study was conducted on 61 opioid-dependent individuals maintained on methadone and assessed the effect of Hatha Yoga therapy on treatment outcomes as compared to traditional group psychotherapy.<sup>[22]</sup> However, there was no significant benefit of Hatha Yoga over group psychotherapy at 6-month follow-up in terms of any treatment outcome (i.e., variety of psychological, sociological, and biological measures). A more recent

study done on 75 female patients of opioid dependence syndrome reported significantly higher improvement in mood status and quality of life (QoL) in patients in yoga group as compared to routine hospital care at 6-month follow-up.<sup>[23]</sup> Only one study was done in Indian population reported significant increase in physical, psychological, and environmental domains of QoL (WHO-QOL scale) in patient group who also received Sudarshan Kriya Yoga therapy in combination of standard treatment (buprenorphine) as compared to standard treatment alone.<sup>[24]</sup>

### **Yoga and cocaine-use disorders**

Only one study has compared the effect of yoga in patients with cocaine-use disorders. In this RCT, the effect of yoga or meditation with no intervention was studied in 24 human immunodeficiency virus-positive crack cocaine users. After 2 months of intervention, the study arm reported a significant improvement in Perceived Stress Scale total score and Impact of Events Scale compared to control condition.<sup>[25]</sup> Although modest improvement was noted in QoL with intervention, no significant difference was noted in serum cortisol and dehydroepiandrosterone levels.

### **Methodological considerations and issues of the studies included in the review**

It is important to carefully interpret the evidence of yoga therapy on substance-use disorders considering the limitations and caveats in the methodology. Out of 314 studies screened for inclusion into the review, only 16 could be included due to various reasons such as the manuscript not being relevant, not published in English, not having defined physical or psychological outcome parameters and being a narrative review or a systematic review. One of the most important issues in this area is relatively low sample size.<sup>[4,7,20]</sup> Another important biasing characteristic of the studies is the differences in the study sample selection. For example, some studies exclusively studied female patients<sup>[11]</sup> while others were done on a mixed sample.<sup>[4,7]</sup> Differences in the inclusion and exclusion criteria between the studies also lead to difficulties in interpretation. Other major concern is the differences in the yoga therapy itself. For example, the duration of yoga sessions ranged from 1 day to 8 weeks.<sup>[9]</sup> Furthermore, there has been a heterogeneity in terms of manner in which yoga has been defined/conceptualized. This includes the definition of yoga (Sudarshan Kriya vs. Vinyasa vs. Hatha Yoga), number of sessions provided, number of participants (individual vs. group), differences in follow-up assessment (ranging from 1 day to 6 months), outcome variables, and presence or absence of other substance use among many

others [Table 1]. Majority of the studies relied on the self-report measures of substance use on outcome and hence lacked objective parameters to assess them. Further studies are needed which measure the outcome on objective parameters such as toxicology screen and not rely on indirect or surrogate markers such as self-report, measuring outcome in parameters such as mood, anxiety, and QoL. Differences in the control arm also add to difficulties in interpretation (e.g., reading material, nonactivity controls, wellness program, meditation, etc.). As a concomitant treatment can become an important confounder in such kind of studies, it is possible that patients motivated to take yoga therapy may also seek additional treatment which is especially important when the study is trying to assess efficacy of yoga therapy alone. Because of these reasons, studies done on yoga therapy should be interpreted cautiously given the various differences in the type, duration, and outcome measures of yoga therapy in substance-use disorders.

### **CONCLUSION AND IMPLICATIONS**

Substance-use disorders are among the major public health problems worldwide and are among major contributors to increased morbidity and mortality. Despite this, the treatment options available for the management of these disorders are rather limited. The management of substance-use disorders is challenging because of the various domains of symptoms (e.g., cognitive, physical, behavioral, psychological, etc.) being present in patient with substance-use disorders. Hence, the treatment of substance-use disorders must include a variety of interventions which may target each of these domains. As per our review, yoga and related therapies appear to be an effective tool, especially in case of nicotine-use disorders. Yoga and related therapies appear to be a promising intervention. Although most of the studies reported favorable short-term outcomes, they are to be interpreted with caution considering the use of indirect measures such as QoL, score on depression rating scale, and markers of stress. Hence, there is a need for studies assessing the long-term effects of yoga on substance-use disorders employing objective measures of assessing drug use. Further, there is a need for studies with rigorous study methodology for building up evidence base and recommending yoga in management of substance-use disorders.

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### **Conflicts of interest**

There are no conflicts of interest.

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