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Is Yoga Effective in Preventing Nicotine Cravings During Smoking Cessation in Adults?

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INTRODUCTION

Yoga is an aerobic exercise that helps reduce stress. It includes postures and deep breathing techniques[1]. Smoking cessation is the process of discontinuing tobacco smoking, accompanied by difficulty sleeping, irritability, frustration, anger, anxiety, restlessness, depression, and weight gain.

In the United States, 21% of the adult population are tobacco smokers.[1] This results in nearly $130 billion in direct medical care for adults.[2] Smoking cessation reduces the chance of death, and increases life expectancy, even for those who stop after age 65.[2] Currently, there are more than 480,000 deaths in the U.S., as a result of cigarettes smoking. Smoking is the leading cause of preventable morbidity and mortality in the United States[2]. Smoking has been shown to increase the rates of coronary artery disease, pulmonary disease, cancer, peptic ulcers disease, osteoporosis, and many other diseases.[1,2] A combination of counseling and pharmacotherapy is the most effective means of providing smoking cessation, but there are adverse effects. The two greatest side effects are depression and weight gain.[3] Yoga may help control these symptoms and aid in smoking cessation.

Nicotine, which is found in tobacco products, is a highly addictive substance that increases the levels of dopamine in the brain. Among smokers, 70% report wanting to quit, while only 40% attempt to quit each year.[2] Quitting is both mentally and physically challenging. Among those who make unaided attempts to quit, only 3-6% are still abstinent a year later.[4] While 70% of smokers are seen at least once a year, by their physician, only 20% receive medical advice about breaking the addiction.[2] Symptoms of smoking cessation include difficulty sleeping, irritability, frustration, anger, anxiety, restlessness, depression, and weight gain. Many different counseling techniques are used to aid in cessation including: support from friends,

family, and health care providers to fight withdraw; group counseling in the forms of lectures and meetings; hypnosis; and acupuncture. In addition, there are many different pharmacologic therapies to aid in quitting. Nicotine replacement therapy (NRT) has been shown to be effective, and comes in many different forms including: gum, lozenges, inhalers, nasal spray, patches, and electronic cigarettes. Bupropion (150-300 mg/day), an anti-depressant, is an affective agent that works by mimicking nicotine.[2] Varenicline, a partial nicotinic acetylcholine- receptor agonist has also been shown to improve cessation rates, however, the medication is not well understood. Both medications have negative affects on mood and sleep, causing compliance issues.

Yoga may aid, along with other methods listed above, in helping with symptoms of nicotine craving, during withdraw. Yoga may assist in weight loss, improve respiration, and decrease depression and anxiety, which coincide with both the symptoms of withdraw and the negative effects of pharmacologic treatments.[5] Yoga is also an ideal treatment regiment, because it is low impact on joints, and has less cardiovascular exercise risks. Therefore, it may be safer for smokers.

OBJECTIVE

The objective of this selective EBM review is to determine whether or not yoga is effective in preventing nicotine cravings during smoking cessation in adults, who have smoked more than five cigarettes per day for longer than one year.

METHODS

This review focuses on three randomized control trials (RCT) with adults who have smoked more than five cigarettes per day for longer than one year. The intervention studied was

yoga during a smoking cessation program compared to a control. All three studies had self reported surveys.

Bock et al. studied a group-based cognitive-behavioral therapy (CBT), for smoking cessation, plus a twice-weekly group-based yoga program compared to a CBT for smoking cessation, plus a group-based wellness program as the control. The yoga groups were taught Vinyasa style yoga by qualified instructors in one-hour classes. The control watched one-hour long videos on a variety of health topics guided by a Ph.D. psychologist with discussions. The study included 55 females separated in groups of 8-10 and lasted 8 weeks. The groups were encouraged to eat healthy, and no nicotine patches were not provided to either group. However, the participants were not banned from using them. Patients were followed up at 8 weeks, 3 months, and 6 months with questionnaires about anxiety, depression, overall wellbeing, and temptations to smoke.

Elibero et al. studied three groups of 76 daily smokers, after a 1-hour cessation of smoking, before performing an activity for 30 minutes. One group had to do a cardiovascular exercise on a treadmill (CE), another performed hatha yoga (HY), and a third did a non- exercise activity, which included educational video about exercise (NE). The surveys were conducted before, immediately following the activity, and 20 minutes after the activity, and scored from 10-70. Patients were taught and monitored by professionals.

Shahab et al. compared an instructor led yogic breathing group exercise (YBG) to a video control group that talked about healthy habits (VCG). There were 96 adults split into two groups. Each group performed a 10-minute activity with a survey asking about “urges to smoke” immediately following and 24 hours after the activity.

The research collected for this EBM review was found with PubMed. The searches included the keywords "yoga" and "smoking cessation." All articles were written in English, and published in peer-reviewed journals, after 2010. The articles were chosen based on relevance to the clinical question, and inclusion of patient-oriented outcomes. Inclusion criteria were studies with populations over 18 years old, who smoked more than five cigarettes per day, for over one year. Statistical data was reported using p-value, Chi squared, t-tests, numbers needed to treat (NNT), analysis of variance (ANOVA), and analysis of covariance (ANCOVA).

Table 1: Demographics and characteristics of included studies

Study	Type	# Pts	Age (yrs)	Inclusion Criteria	Exclusion Criteria	W/D	Interventions
Bock et al, 2012[6]	RCT	55	>18	>5 cigarettes per day	<5 cigarettes per day; already physically active; currently practicing yoga; had current diagnosis of heart disease, lung disease, or orthopedic condition; currently in treatment for psychiatric illness or were using illegal substances	0	CBT for smoking cessation plus a twice-weekly group-based yoga program
Elibero et al, 2012[1]	RCT	76	18-45	>10 cigarettes per day > 1 year; expired CO 8 ppm or greater; no currently engaged in an attempt to quit smoking	Impaired hearing or vision; unable to participate in 20 min of moderately intense activity; taking benzodiazepines, antidepressants, neuroleptics, stimulants, anticonvulsants, or beta agonists; BMI >35; currently practicing yoga	0	1 hr nicotine abstinence followed by 30 minutes of Hatha yoga
Shahab et al, 2012[7]	RCT	95	>18	>5 cigarettes per day >1 year; in good health	Pregnant; using NRT products	3	Practicing yogic breathing for 10 minutes with the help of a trainer

OUTCOMES MEASURED

The outcomes measured were a reduction of nicotine cravings. Bock et al. measured smoking abstinence via patient self-reported surveys and were biochemically confirmed through salivary samples. Elibero et al. measured a self reported survey on craving to smoke, and verified with CO samples of participants. Shahab et al. used a self reported survey which included smoking cravings and was verified with a 12-hour CO abstinence.

RESULTS

The three studies explored the efficacy of yoga in preventing nicotine craving. All three studies were randomized control trials. One trial used dichotomous data and the other two used continuous data. Experienced yoga instructors were used in every study.

Bock et al. compared the yoga group to the wellness group, and showed that after 8 weeks the yoga group was more likely to be 7 days smoke-free with statistically significant results. Yoga participants, in the short term, have better cessation outcomes compared to control participants (40.6% vs 13.0%, OR, 4.56; 95% CI= 91.12-18.57, $p<.003$). At the 3 and 6 month follow up assessments, the yoga group and the abstinence group showed no statistically significant differences. The number of people needed to treat with yoga exercises was 4, to see a significant increase in abstinence, at 8 weeks. While comparing the changes from baseline between the two groups, the yoga group had significant reductions in anxiety, temptations to smoke, as well and increase in overall wellbeing. The control group had significant improvements in temptations to smoke only. All participants were accounted for at the conclusion of the study. When using ANCOVA analysis of the data, yoga participants had

greater reductions in anxiety and greater increases in overall health, but the results were not statistically significant.

Table 2: Reported smoking cessation for 7 days following 8-week program.

Study	CER	EER	RRR (*EER-CER/CER)*	ABI (*EER-CER)*	NNT (*1/ABI)*	p-value
Bock et al	0.13	0.406	2.12	.276	4	<0.03

Eilbero et al. is a study with continuous data comparing three groups: cardiac exercise, yoga, and control. All subjects who entered the trial were accounted for at its conclusion. When measuring "craving to smoke" before an activity, immediately after, and 20 minutes later, data was compared using ANOVA analysis. Yoga compared to the control showed significant decrease in "craving to smoke" according to QSU brief global factor score surveys ($F(1.59, 76.39)= 3.41$, $p<0.05$). Yoga compared to CE on the same measure was not significant. CE compared to the control also showed a significant decrease in "craving to smoke" ($F(1.59, 71.76)= 3.25$, $p=0.05$). This is can be seen in Table 3.

Table 3: Reported craving to smoke comparisons immediately post exercise.

	Yoga Vs. Control	Yoga Vs. CE	CE Vs. Control
Mean Score	(1.59, 76.39)= 3.41	NA	(1.59, 71.76)= 3.25
P value	< 0.05	> 0.05	= 0.05

Additionally, comparisons were done to study participants' affect. These results showed that CE and yoga activities both had statistically significant increases in positive affect and

statistically significant decreases in negative affect. The control did not show differences in positive or negative affects.

Shabab et al. was a study comparing yoga breathing techniques to the healthy habits control. All patients who entered the study were accounted for in its conclusion. Patients in VCG were given information about breathing, and were trained on the technique. This was a reasonable comparison. The study reported data as t-tests and X^2 test for continuous data. The results of the immediate study showed statistically significant decreases in "strength of urges to smoke now" ($F(1,96)=16.1$, $p<0.001$); "craving cigarettes now" ($F(1,96)=16.1$, $p<0.001$); and "desire to smoke now" ($F(1,96)=6.6$, $p=0.012$) as seen in Table 4.

Table 4: Reported symptoms immediately following activity.

	Strength of urges	Craving cigarettes	Desire to smoke now
Mean Score	(1,96)=16.1	(1,96)=16.1	(1,96)=6.6
P value	<0.001	<0.001	=0.012

There was no significant difference in "strength of urges to smoke now," "craving cigarettes now," and "desire to smoke now" at the 24-hour follow-up. The data also displayed that at the 24-hour follow up, a higher proportion of participants in the yoga group thought that yogic breathing exercises were "very much": or "extremely" useful (47.9%, 95% CI 33.8-62.0), than compared to the control group (18.8%, 95% CI 7.7-29.8) $X^2(1)=9.2$, $p=0.002$.

No adverse events related to any of the interventions were reported. Participants had trained professionals monitoring at all times when performing activities. Yoga is a safe intervention, with few adverse events associated with its practice.

DISCUSSION

This systematic review displays a possible efficacy of yoga as a therapy in smoking cessation in acute studies. All three of these studies showed some relief of craving nicotine, however, the limitations of these studies may not have conclusive evidence.

The greatest limitation to these studies was that results were only statistically significant results in short term outcomes. The longest outcome was Bock et al. which showed results up to seven days after the therapy. A second limitation was the length of the studies. Bock et al, was an 8-week intense group based therapy, with follow ups at a 7 days, 3 months and 6 months. During this time, the participants may have improved their yoga practice. There was, however, no limit to the amount of time the participants could perform yoga. There was only a minimum. Shabab et al. was a 24-hour study that only had immediate significant smoking cessation effects. This study did have results that showing yoga participants felt breathing exercises were useful 24 hours later. Eilbero et al, only followed participants for 20 minutes after the therapy, but does show that yoga can be effective. These results, along with the other survey questions, show that there could be a decrease in nicotine craving, but only acutely.

These studies also compared different aspects of yoga. One study had participants perform yoga over 8 weeks. Another study used only breathing techniques. The third, used one 30-minute session of yoga. There was little standardization in any study controlling the number of times a participant may use yoga techniques. It may be difficult to understand what is expected and how yoga is performed, with just breathing techniques, or one session. However, with some commitment, patients are successfully reducing cravings. In addition, all three studies relied on participants' self reporting symptoms. While this was unavoidable, it could have introduced a bias based on the participants' preconceived notions of yoga.

Yoga has been an effective way to exercise and meditate for thousands of years in India.[6] There are many studies in non-smokers that show yoga has improvement on affect, mood, perceived stress, and anxiety.[3] Yoga is also a proven effective exercise for individuals who are unable to engage in strenuous cardiovascular exercise. There are few limits to yoga exercise. It is scaled to each individual's physical and mental ability.[1] Yoga classes are not covered by insurance. Classes vary in price and availability, making this an extra expense and concern for a person trying to quit.[6]

CONCLUSION

The systematic review of the three randomized control studies comparing yoga to a control in smoking cessation proved to be conclusive. Yoga is effective in preventing nicotine cravings during smoking cessation in adults acutely. One study showed that it was effective for up to 7 days. The studies did have faults though. The studies were based on self-reported surveys, in which some participants performed a task and others did not. This could have placed a bias on the participants or researchers. Further studies with larger populations, over longer periods of time, would help to fully define the effectiveness of yoga. Studies comparing other cardiovascular to yoga exercise could be beneficial. Additionally, studies using yoga with nicotine replacement or other pharmacotherapies should be explored.

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