

Psychosocial determinants,
contraindications, and
preexisting conditions for hot
yoga practitioners: an
Examination of depression and
anxiety risks

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Hot Yoga

- ▶ Hot yoga in general is yoga that is practiced in a heated environment, generally ranging from 80-108 degrees Fahrenheit (Avitzur, 2014; Tracy & Hart, 2013).

Introduction

- ▶ For Americans, the lifetime prevalence of anxiety disorders is currently estimated to be 29% and around 20% for depression-related mood disorders (Kessler et al., 2005).
- ▶ Yoga is an activity that has been found to support an increase in mood (positive affect) and decrease both self-reported and clinical measures of depression and anxiety (Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012).



Literature Review

- ▶ Initial studies of hot yoga appear to reveal potentially similar benefits including improved mental health well-being indicators such as core self-evaluation and life satisfaction (Mace & Eggleston, 2016; Rissell, Miller, Lloyd, & Williams, 2014).

Lit Review cont...

- ▶ However, the risks of hot yoga participation for individuals who suffer from anxiety and/or depression have not been evaluated and therefore are unclear.
- ▶ The aim of this study was to determine the type and rate of adverse reactions to hot yoga of individuals that suffer from anxiety and/or depression.

Methods

- ▶ Survey 700 individuals who practiced hot yoga at least once in the last month with a yoga history of at least three months
- ▶ Adults living in the US or Canada
- ▶ No incentives
- ▶ 98 item survey

Methods: Design

- ▶ A cross-sectional survey was developed based upon the results of a pilot study of individuals who practice hot yoga regularly for at least three months (Mace & Eggleston, 2016).
- ▶ The survey asked respondents to report their pre-existing health conditions, demographic information, along with their yoga and hot yoga behaviors.

Methods cont...

- ▶ They were also asked to report adverse reactions they had experienced as a result of participating in hot yoga.
- ▶ Adults aged 18 and over, who could read and understand English were invited to take the online survey via Qualtrics during the summer of 2016.

Criteria and Sampling

- ▶ Inclusion criteria for the main study included that participants: had practiced yoga AND hot yoga at least once to be eligible for participation.
- ▶ Purposive sampling was used to ensure that at least 40% of the sample was male as males are often underrepresented in yoga research and (n=700) participants were recruited with full responses.

Measures cont...

- ▶ For the purpose of this study, only those who reported having a pre-existing medical condition (diagnosed) anxiety or depression were included in analyses.
- ▶ Depression was defined as any type of depressive disorder and anxiety was defined as any type of anxiety disorder.
- ▶ Nearly half of the main study sample (n=317) met the inclusion criteria for this study.

Measures-Participants

- ▶ Participants were asked to report whether they had a series of medical diagnoses including anxiety and depression.
- ▶ Participants were not able to indicate a specific anxiety or depressive disorder.

Participants cont...

- ▶ Information about current medications taken by participants was not available.
- ▶ Participants were first asked to indicate whether or not they had ever had an adverse reaction to hot yoga.
- ▶ Additionally, participants were able to write in other responses that were not available in the list.

Measures cont...

- ▶ Then participants were asked, if they had an adverse reaction to hot yoga to select from a list of adverse reaction which included: injury to neck, injury to other muscle area, heat stroke, dizziness, headache, cramps, confusion, vomiting, visual disturbances, nausea, dehydration, joint damage, infection, feeling light headed, cartilage damage, passing out.

Pilot studies

- ▶ Pilot study with salient elicitation interviews using Reasoned Action Approach (Fishbein, 2008; Mace & Eggleston, 2016)
- ▶ Smaller survey of individuals that practice hot yoga
- ▶ Identify items to be used for a larger survey
- ▶ Advantages/Disadvantages
- ▶ Approval/Disapproval
- ▶ Facilitators/Barriers
- ▶ Pre-existing conditions
- ▶ Contraindications
- ▶ Social demographic variables

Pre-existing conditions

- ▶ Low blood pressure 34%
- ▶ Back pain 33%
- ▶ Anxiety 26%
- ▶ Other muscle pain 22%
- ▶ Other 20%
- ▶ Depression 19%
- ▶ Asthma 16%
- ▶ Back injury 15%
- ▶ Any heart condition 8%

Perceived Benefits

- ▶ More flexibility 63%
- ▶ Improved mood 58%
- ▶ Increased fitness 43%
- ▶ More stamina 42%
- ▶ Clearer skin 36%
- ▶ More strength 35%
- ▶ Decreased anxiety 35%

Perceived Benefits cont...

- ▶ Weight loss 34%
- ▶ Increased vitality 34%
- ▶ More youthful feeling 32%
- ▶ Decreased depression 31%
- ▶ Increased libido 15%
- ▶ Improved sex life 14%

Self-Reported Adverse Outcomes

- ▶ Feeling light headed 61%
- ▶ Dizziness 60%
- ▶ Nausea 35%
- ▶ Dehydration 34%
- ▶ Joint damage 11%
- ▶ Injury to back 7%
- ▶ Injury to other muscle area 7%
- ▶ Heat stroke or sickness 5%
- ▶ Injury to neck 4%

Data Analysis

- ▶ Demographic characteristics, health history, yoga behaviors, and the experience of adverse outcomes from hot yoga participation of the sample were analyzed.
- ▶ Odds ratios (OR) for the presence or absence of various health conditions and the outcome of various adverse reactions to a hot yoga session were calculated due to the cross-sectional design of the study.

Descriptive Statistics

- ▶ The sample of (n=700), 60% female (n=420) and 40% male (n=277).
- ▶ 73% Caucasian (n=514), African-American (11%, n=76), Hispanic/Latino (8%, n=59), Asian, (6%, n=43),
- ▶ Age Range 18-79; mean 32.6 (SD 5.4 years).
- ▶ 1% had not completed a high-school education
- ▶ 18% had a high-school diploma/GED
- ▶ 36% had completed some college or a 2-year degree, 32% had achieved a bachelor's degree
- ▶ 12% had achieved a graduate or professional degree.

Yoga Behaviors

- ▶ Just over half of the sample (52%, n=364) reported that they preferred hot yoga over non-hot yoga practice.
- ▶ Respondents most frequently reported that they participated in hot yoga once a month (40%), 2-3 times per month (23%), followed by once a week (16%), and then 2-3 times per week (13%).
- ▶ Nearly half of participants reported currently practicing Bikram hot yoga 49% while another half reported participating in another non-Bikram hot yoga 48% and the remaining participants reported that they were not currently practicing a hot type but that they had previously.

Hydration Behaviors

- ▶ A high number of participants reported that they drank water prior to engaging in hot yoga practice (82.7%) in the main study, though it is unclear when these individuals hydrated themselves before class.
- ▶ Those who drank water before hot yoga practice were associated with not having reported symptoms of heatstroke ($p=.001$) and confusion, ($p<.001$), but none of the other dehydration related symptoms were significant, including self-reported dehydration.

Hydration 2

- ▶ Fewer participants reported that they drank water during hot yoga practice (63.4%).
- ▶ Drinking water during hot yoga practice was associated with not experiencing symptoms of dehydration ($p=.007$).

Hydration 3

- ▶ Another 46% reported that they drank an electrolyte beverage either before, during, or after engaging in hot yoga practice.
- ▶ Those who drank an electrolyte beverage before, during, or after a hot yoga session were associated with not experiencing an adverse reaction during a hot yoga session $p=.005$.
- ▶ Specifically, those who drank an electrolyte beverage had a lower association of heat stroke $p=.003$.

Results: RAA-Salient Consequences

Advantage	n	%
Feeling Relaxed	556	79.4%
Improved Flexibility	498	71.1%
Improved Fitness	418	59.7%
Clearer Thinking	326	46.6%
Disadvantage	n	%
Insecurity	355	50.7%
Injuries	250	35.7%
Anxiety	140	20.0%
Eastern Philosophy/Religion Affiliation	77	11.0%

Salient referents

Approval	n	%
Spouse/Significant Other	420	60.0%
Family	371	53.0%
Friends	344	49.1%
Co-workers/employer	70	10.0%
Disapproval	n	%
Co-workers/employer	153	21.9%
Family	119	17.0%
Friends	115	16.4%
Spouse/significant other	88	12.6%

Salient Circumstances

Facilitator	n	%
Having enough time	464	66.3%
Convenient class times	353	50.4%
Convenient location of yoga studio	307	43.9%
Having enough money	251	39.1%

Barrier	n	%
Not having enough time	371	53.0%
Not having enough money	254	36.3%
Not having convenient class times	245	35.0%
Not having a convenient location	213	30.4%

Results-Mental Health

- ▶ Of the 700 individuals sampled, nearly half (n=317, 45%) reported having some form of anxiety or depression.
- ▶ Of that sample (n=142) 20% reported only having anxiety and 58 (8%) only had depression and 17% individuals (n=117) reported comorbid anxiety and depression.

Descriptive

- ▶ Of the original sample 37% of all males reported having either depression or anxiety, allowing for an analysis of (n=103) men in the mental health analysis (n=47 only anxiety, n=25 only depression, =31 comorbid anxiety and depression).

Results-Mental Health cont...

- ▶ Of the original sample of women (n=420), 50.4% (n=212) reported some type of depression or anxiety (n=95 anxiety only, n=31 depression only, and n=86 comorbid anxiety and depression).
- ▶ The participants identifying their gender as “other” identified a pre-existing anxiety disorder only, while the participant identifying as transgender did not identify either depression or anxiety.

Results-Depression

- ▶ A quarter of the sample reported that they suffered from depression, comorbid or alone (n=175).
- ▶ Pre-existing depression was not significant when participants were asked to report whether they had ever had an adverse reaction to hot yoga participation.
- ▶ However, it was significantly associated with several specific adverse reactions to hot yoga including self-reported dehydration $\chi^2 = (1, n=700), 4.7, p=.03, OR = 1.6$ so individuals reporting depression appear to be at least 1.5 times more likely to develop dehydration during hot yoga practice.

Results Depression cont...

- ▶ Depression was also associated with feeling light headed during hot yoga practice $p < .001$, OR = 2.3, injury to other muscle area (non-joint) $p = .02$, OR = 2.6, headaches 10.4, $p < .001$. OR = 2.4.
- ▶ Not significant: heat stroke, nausea, joint damage, infection, cartilage damage, passing out, injury to neck, passing out, dizziness, cramps, confusion, and visual disturbances $p = .003$, OR = 6.2.
- ▶ Participants who identified pre-existing depression had a significant association with decreased anxiety and symptoms of depression ($p < .001$), but improved mood was not significant.

Results-Anxiety

- ▶ In total 259 participants reported having some type of anxiety disorder (comorbid or stand alone) and this was not significantly associated the global question regarding an adverse outcome of hot yoga practice.
- ▶ However, anxiety was associated with the self-reported experience of dehydration $p=.005$, OR =1.8, feeling light headed $p=.004$, OR =1.9, dizziness 6.7, $p=.01$, OR =1.7, headache 8.2, $p=.004$, OR =2.1, 7.6, $p=.006$, OR =5.3.

Results-anxiety cont...

- ▶ Adverse outcomes not significantly associated with anxiety were heat stroke, nausea, joint damage, infection, cartilage damage, passing out, injury to neck, injury to other muscle group, cramps, confusion, vomiting.

Results-anxiety cont...

- ▶ There were (n=117) participants who identified comorbid anxiety and depression, however when comorbid status was assessed for association with the global question about adverse reactions it was not significant.
- ▶ The only significant symptom reported was feeling light headed $p=.003$, OR =2.4 and all other adverse reactions were not significant.

Discussion

- ▶ There has never been such a large sample size on participants of hot yoga as was conducted in the original study (n=700), so whether it is typical for such a large portion of those who practice hot yoga to experience some type of mood disorder is unknown.

Discussion cont...

- ▶ However, the original study sample did find rates of chronic disease in the study population to be similar to that of the general American adult population.
- ▶ Also previous research suggests that some of the main motivations for practicing hot yoga are to improve mood (Mace & Eggleston, 2016) so it would make sense for those with anxiety or mood disorders to seek out hot yoga practice as a coping mechanism.

Discussion cont...

- ▶ The study was limited by wide definitions of both anxiety and depression, both disorders were self-reported and while the questions asked for current medical conditions, some participants may have misinterpreted the question and reported a self-diagnosed status.

Discussion cont...

- ▶ Furthermore, there was no measure to determine what if any type of medication respondents may be taking which could have an impact on the experience of adverse reactions to hot yoga, particularly those related to over-heating and dehydration.
- ▶ Common side effects of antidepressant medications include dry mouth, dizziness, nausea, blurred vision, anxiety, and more (Chang, 2011).

Discussion cont...

- ▶ Common side effects of anti-anxiety medications include nausea, confusion, dizziness, blurred vision, and headache (Konkel, 2016).
- ▶ All of these medication side-effects are similar to those more frequently reported in participants who had identified anxiety or depressive disorders.

Discussion cont...

- ▶ And while we did not have the medication profiles for these participants, it would be interesting to determine to what extent heated exercise (yoga) might exacerbate the risk or experience of these side effects in medicated participants.
- ▶ Aside from the medication side-effects related to these conditions, depression and anxiety themselves have symptoms that can mimic some of the commonly reported adverse side effects of hot yoga participation.

Discussion cont...

- ▶ For example, nausea, dizziness, confusion, visual disturbances, and thirst are all symptoms that can be experienced by a person suffering from an anxiety disorder.
- ▶ Overall, the risks of participating in hot yoga do not appear to outweigh the benefits for this group of participants which reinforces the self-reported findings in the pilot study.

Conclusions

- ▶ The practice of hot yoga appears to be generally safe and potentially beneficial for individuals who suffer from anxiety or depression.
- ▶ Those who do suffer from anxiety or depression may have a higher risk of experiencing adverse outcomes related to overheating and dehydration while practicing hot yoga.

Conclusions cont...

- ▶ Those with anxiety and depression did not have a higher risk for muscle, cartilage, or joint injuries than those without those mental health conditions.
- ▶ Determining the interaction between anxiety and mood disorder symptoms, psychiatric medications, hydration levels, and hot yoga practice warrants further investigation.

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Thank you

▶ Questions?