

Correlation between Yoga Practice, Connectivity with Nature and Climate Change Awareness in Indian Population

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Abstract

All around the world, climate change is increasingly affecting people's mental and physical wellbeing. Increasing action-oriented awareness amongst people is a critical need. This study assesses the correlation between yoga practice, connectivity with nature and climate change awareness amongst the Indian Population. 1149 SKY and 1387 non-SKY practitioners were surveyed across India. Participants were assessed on connectivity with nature and climate change attitude. SKY practitioners scored significantly higher than the non-SKY practitioners on connectivity with nature and climate change, demonstrating pro-environmental attitudes. They also scored significantly higher on climate change intentions indicating a higher likelihood to adopt behaviors that help the environment and reduce climate change. Findings from the survey suggest that SKY practice helps people build strong relationships with nature and supports pro-environmental behaviors. SKY can be a useful tool for mobilizing people's participation in environmental conservation efforts.

Keywords: Climate change • Connectivity with nature • Sudarshan Kriya Yoga • Environment

Introduction

It is well-known that climate change has a vital impact on human health, directly affecting social and environmental determinants of health such as clean air, safe drinking water, sufficient food, and secure shelter. Climate change is expected to cause 250,000 deaths per year between 2030 and 2050, from diseases like malnutrition, malaria, diarrhea, and heat stress. The direct damage and cost to health is estimated to be 2-4 billion USD per year. This is only the physical impact: Climate change could also lead to psychological stressors such as low confidence and an eroding sense of worth, expose people to trauma, and deteriorate physical as well as community wellbeing [1]. Research shows that climate change can amplify mental health stressors due to disruption in activities, and even extend to a perceived loss of cultural identity. Disasters can lead to psychiatric trauma, such as severe anxiety reactions in the short term, and anxiety, depression and aggression in the long-term. Slow-developing extreme events such as droughts and desertification could also cause an increase in suicidal tendency in farmers.

After the Kyoto protocol, 1997, many policies and agreements have been formulated to mitigate climate change by reducing emissions, and many governmental and non-governmental organizations are promoting the use of eco-friendly alternatives while seeking reduction in the use of fossil fuels. However, as many experts point out, these reductions are not taking place at the required pace. While there is a lack of enough engagement and action, overall the degree of awareness and concern

about the issue continues to rise amongst those who have faced a natural calamity such as flood or drought [2]. However, only being conscious of the issue is not enough; there is an urgent need for every individual to adopt eco-friendly alternatives and reduce their carbon footprint; hence, people's participation is of extreme importance. As a study participatory, effective, interdisciplinary, creative and affect-driven approaches are required.

To mitigate climate change effectively, direct engagement translating into behavioral change at the individual level is necessary on a large scale. Direct engagement implies an intention to protect the environment, which is sustained by ecocentrism and a sense of connectedness with nature. Connectedness with nature is an important element that strengthens behavioral intentions. People who have less self-transcendence have lower ecocentrism and lower personal norms, which result in weaker behavioral intentions to protect the environment. Certain pathways such as social contact, emotion, meaning, compassion, and beauty contribute to improving nature connectedness. A study that nature connectedness is an important factor that leads to pro-nature conservation behaviors and actions explain connectivity with nature as an emotional phenomenon that appears to engender some kind of oneness with nature and increases compassion to non-human species, and is related to greater engagement with environmental concerns. It leads to pro-environmental behavior.

Spiritual practices such as mindfulness meditation help to establish and strengthen connectedness with nature in adults. Practices like Yoga have also been shown to increase empathy and social connection.

Yogic techniques are being increasingly studied as adjunct treatment modalities to improve physical and mental health, but there is little research that explores their effect on pro-environmental behavior. In this study we explore the association between a yogic breathing practice and people's connection with nature and attitude towards climate change. We aim to study if yoga practice can mediate the relationship between people and nature, and enhance people's sensitivity to climate change. Through a cross-sectional survey of practitioners as well as non-practitioners of yoga, the paper explores the correlation between yoga practice and climate change awareness as well as connectivity with nature, which are key elements in creating long-term participation in environment-friendly sustainable practices.

Materials and Methods

Study design

A cross-sectional survey was conducted across India over 3-months (July-September 2019) with the objective to understand the correlation between the practice of yogic breathing, connectivity with nature, and climate change awareness amongst yoga practitioners and non-practitioners. The yoga technique studied here is called Sudarshan Kriya Yoga (SKY), a rhythmic yogic breathing technique with its roots in traditional yoga. The data was collected, in the form of a questionnaire using both online and offline modes. Standardized tools for the Connectivity with Nature and Climate Change Attitude were used to create questionnaires which took approximately 10 minutes to fill. The survey was publicized by word of mouth and through the social media platforms. It was hypothesized that SKY practice has a positive impact on mental health, empathy and social connectedness which leads to feeling connected with nature and being sensitive to climate change.

Population

Adults from both genders were included in this study. They were from different educational and economic backgrounds and had varied dietary

habits. To acquire maximum responses the survey was conducted at colleges, universities, households, worksites and a comparable population of both the groups was sought. Participation in the survey was completely voluntary, participants were made aware of this and informed consent was obtained. Study participants who had previously completed a SKY course provided by the Art of Living Foundation, and had participated in at least one SKY session within the past 6-weeks, constituted the yoga (SKY) practitioners (experimental) group. Non yoga practitioners (control) had no previous experience of SKY or any other yoga practice. Total of 2551 responses were received from both SKY practitioners and non-SKY practitioners groups. Out of 2551; 15 people provided incomplete information and hence their data was discarded. Data from 2536 subjects was further segregated into the required format and analyzed.

Details of Intervention

Sudarshan Kriya Yoga (SKY) is a method of cyclical controlled breathing with its roots in traditional yoga. A fundamental aim of SKY is to elicit a mind-body interaction of calmness and alertness. A typical SKY session is 30 minutes long and consists of four distinct yogic breathing stages (Ujjayi, Bhastrika, OM, and Sudarshan Kriya). Ujjayi involves experiencing the conscious sensation of the breath touching the throat. This slow breath technique is performed at a rate of 2-4 breaths per minute (bpm). During Bhastrika, the air is rapidly inhaled and forcefully exhaled at a rate of 30 bpm. Three one-minute rounds of Bhastrika are followed by a few minutes of normal breathing. Next, Om is chanted three times with very prolonged expiration. Lastly, Sudarshan Kriya rhythmic breathing is done with slow (20 bpm), medium (40-50 bpm), and fast (60-80 bpm). A SKY session is done in a seated posture, and eyes closed during the session.

Connectivity with Nature as a Measure of Environmental Values

The Dutcher Connectivity with Nature Scale is a 15 item scale to examine people's concerns about nature. The scale is divided into 3 sub scales - Connectivity with nature, Environmental concern and Environmental behavior.

Connectivity with nature sub scale consisted of 4 items that were designed to determine the extent to which the survey participants experienced a sense of connectivity with the natural environment. It's a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Questions like "I feel a sense of oneness with nature" are included to understand one's sense of oneness and connection with nature.

The Environmental concern subscale included five items. Each of the five items was scored using a 5-point Likert scale of agreement ranging from 1 (strongly disagree) to 5 (strongly agree). Questions like "If things continue on their present course, we will soon experience a major ecological catastrophe" measure one's concern for the planet and the environment. The Environmental behavior subscale helps to understand the respondents' beliefs and pro-environmental actions. A series of six yes/no-based items were used to measure this parameter, for example "Have you or members of your household: Stopped buying a product because it caused environmental problems?" Higher scores depict greater connectivity with nature.

The climate change attitude survey

The Climate Change Attitude Survey (CCAS) is composed of 15 Likert-type attitudinal items selected not only to measure attitudes and beliefs about climate change, but also to elicit the intentions to enact positive change. The scale is divided into 2 subscales that distinguish between one's beliefs (9-items) and intentions (6 items) toward the environment with a focus on climate change. Each item is in a 1-5 Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Whereas questions like "I am concerned about global climate change" measure one's beliefs, questions like "I can do my part to make the world a better place for future generations" understands one's intentions. Higher scores indicate a higher awareness for climate change, and higher likelihood that

the individual will enact positive changes in the environment with respect to climate change.

Data analysis

Data was masked to ensure confidentiality. This masked data was scored for respective scales and the composite scores were calculated for connectivity with nature (three subscales) and sensitivity to climate change (two subscales). Responses were grouped according to the practice of Sudarshan Kriya Yoga. The practitioner and non-SKY practitioner population was further divided as per age, gender, diet, education, and income. The mean score and SD were calculated in respect of each combination. The two tailed t-test at significance level of 0.05 was used to compare differences between SKY and non-SKY practitioner groups for all domains in both scales. The test was performed using the Microsoft Excel Data analysis tool. To find the correlation between the two scales, Pearson Correlation was calculated for the SKY and non-SKY practitioner group.

Results

The total numbers of responses studied were 2536, of which 1432 respondents were males and 1104 were females. The number of non-SKY practitioners was 1387 and 1149 were SKY practitioners. The demographic characteristics of the population (Table 1).

Participants Characteristics at Baseline (N=2536)				
Characteristic	Type	SKY Practitioners	non-SKY practitioners	Total
Age	Mean(SD)	32.9 (12.3)	26.9 (8.6)	29.6 (10.9)
	Min	18	18	18
	Max	76	75	76
Gender n (%)	Male	676 (26.7)	756 (29.8)	1432 (56.5)
	Female	473 (18.7)	631 (24.88)	1104 (43.5)
Education n (%)	High School degree or equivalent(P. U.C/ Diploma)and less	165 (42.0)	228 (58.0)	393 (100)
	Bachelor Degree	461 (41.4)	653 (58.6)	1114 (100)
	Graduate	65 (73.9)	23 (26.1)	88 (100)
	Postgraduate +Doctorate	455 (49.8)	458 (50.2)	913 (100)
Income/ Month n (%)	0-30000	764 (100)	0	764 (100)
	30000-60000	198 (50.3)	196 (49.7)	394 (100)
	60000+	78 (42.9)	104 (57.1)	182 (100)
Diet n (%)	Vegetarian	851 (64.1)	476 (35.9)	1327 (100)
	Non-vegetarian	219 (25.6)	636 (74.4)	855 (100)
	Vegetarian + Eggs	76 (32.8)	156 (67.2)	232 (100)

Table1: Demographic characteristics of the population.

Connectivity with Nature

The mean scores, SD and p values for the SKY practitioners and non-SKY practitioners for the connectivity with nature scale. Higher scores depict greater connectivity with nature. The average composite score of SKY practitioners (42.0) is greater than non-practitioners (41.1, p value -0.002) (Table 2).

	SKY Practitioners mean (SD)	non-SKY Practitioners mean (SD)	p Value
	Total population	42 (7.6)	41.1 (6.6)
Gender			
Male	42.1 (7.3)	41.0 (6.9)	0.021
Female	41.9 (8.1)	41.2 (6.4)	N
Age			
18-35	42.5 (6.8)	41.2 (6.5)	0.001
36+	41.3 (8.7)	41.3 (6.7)	N
Education			
High School or degree equivalent (P.U.C/Diploma) and less	39.8 (9)	39.5 (6.9)	N
Bachelor Degree	42.5 (7)	41.6 (5.4)	0.019
Graduate	41.7 (8.2)	39.3 (9)	N
Postgraduate + Doctorate	42.5 (7.2)	41.2 (6.8)	0.004
Diet			
Vegetarian	42.2 (7.3)	41.5 (6.7)	0.037
Non-vegetarian	41 (8.2)	40.9 (5.8)	N
Vegetarian + Eggs	40.7 (8.7)	41.2 (7.1)	N

Table2: Mean scores and Standard Deviation (SD) for Connectivity with Nature scores in SKY and non-SKY Practitioners.

The average composite score of male SKY practitioners (42.13) is significantly greater than that of the male non-practitioners (41.04; p value-0.021). Female SKY practitioners score higher than non-SKY practitioners; however the difference is not significant. A domain wise analysis did show a significant difference in environment behavior subdomain amongst the female SKY and non-SKY practitioners, with SKY practitioners scoring higher than non-practitioners.

Millennials score higher on connectivity with nature than the older population in both the SKY and non-SKY practitioners and amongst all the groups' millennial SKY practitioners scores the highest, exhibiting greatest connectivity with nature. The SKY practitioners exhibit higher scores than the non-SKY population in all 4 education categories. These differences are statistically significant in populations with bachelor degrees and higher education. The graduate population was very small in both the groups, especially the non-SKY group (n=23) and that might have led to statistical non-significant difference between the two groups. Diet has a correlation with the connectivity with nature, with vegetarians exhibiting a higher score than non-vegetarians in the overall population.

Amongst the vegetarians, SKY practitioners score higher. The difference was statistically significant. Amongst the non-vegetarian population, the scores are equal and the difference was not statistically significant.

The climate change attitude survey

The scores for the Climate Change Attitude Survey between the SKY practitioners and non-SKY practitioners. The SKY practitioners scored higher than non-SKY practitioners (p value-0.005). For both the genders, SKY practitioners scored higher than non-SKY practitioners but the values were not significant (Table 3).

	SKY Practitioners mean (SD)	non-SKY Practitioners mean (SD)	p Value
	Total	69.1 (14.3)	58.6 (12)
Gender			
Male	60.2 (13.1)	58.6 (11.9)	N
Female	59.9 (15.9)	58.5 (12.9)	N
Age (Years)			
18-35	60.9 (12.1)	58.7 (12)	0.001
36+	58.6 (17.2)	58.3 (12.1)	N
Education			
High School or degree equivalent (P.U.C/Diploma) and less	56 (14.2)	56.3 (11.7)	N
Bachelor Degree	60.3 (14)	59.3 (10.9)	N
Graduate	57.7 (17.5)	52.7 (20.1)	N
Postgraduate + Doctorate	61.8 (13.5)	58.7 (12.9)	0.001
Diet			
Vegetarian	61.2 (13.6)	58.3 (12.8)	0.001
Non-vegetarian	57.3 (14.8)	58.6 (11.7)	N
Vegetarian + Eggs	56.4 (17.1)	59 (10.8)	N

Table3: Mean scores and Standard Deviation (SD) for Climate Change Attitude Survey scores in SKY and non-SKY Practitioners.

Millennials scored higher on the scale, showing higher sensitivity to climate change. Amongst the groups, millennials practicing SKY scored the highest. Only SKY Practitioners with postgraduate degrees are found to be different in their attitude towards climate change, when compared to other groups. Dietary preferences are also associated with attitudes towards climate change. Vegetarian SKY practitioners show higher composite scores than the vegetarian non-SKY practitioners as well as the overall non-vegetarian population. There was no significant difference between SKY practitioners and non-SKY practitioners who follow a non-vegetarian diet.

The domain wise analysis of the climate change attitude survey between the SKY and non-SKY practitioners. The climate change belief sub domain measures perceived beliefs at large about climate change and our environment. The climate change intention sub domain measures intentions regarding making a difference towards climate change.

Analysis depicts a statistical difference between the climate change intentions but not the climate change beliefs between the SKY and non-SKY practitioners. This is interesting as even though the beliefs regarding climate change might be similar in both the groups, the SKY practitioners score significantly higher in their intention to make a difference for improving climate change (Table 4).

Population	Climate Intentions	Change	Climate Beliefs	Change
	mean(SD)		mean(SD)	
Practitioners	22.7 (5.9)		37.3 (9.9)	
Non-practitioners	21.5 (5.6)		37.1 (8.1)	
p value	0.001		N	
Male Practitioners	22.69 (5.5)		37.5 (9.7)	
Male Non-practitioners	21.32 (8)		37.3 (8)	
p value	0.001		N	
Female Practitioners	22.81 (10.7)		37.1 (10.7)	
Female practitioners	Non- 21.7 (8.3)		36.8 (8.3)	
p value	0.008		N	

Table4: Mean scores and Standard Deviation (SD) for Climate Change Intentions and Beliefs scores in SKY and non-SKY Practitioners.

Correlation between connectivity with nature and climate change attitude

Pearson's correlation was calculated between the connectivity with nature and climate change attitude scales separately for both SKY practitioners and non-SKY practitioners. The SKY practitioners showed higher positive correlation than non-SKY practitioners at 0.001 significance level (Table 5).

Type of Participants	Pearson Correlation	p Value
Practitioners	0.762	0.001
Non-practitioners	0.674	0.001

Table5: Correlation between Connectivity with Nature and Climate Change attitudes.

Discussion

Environmental issues like climate change are becoming an increasingly important component of overall quality of life and health all over the globe. Natural disasters; such as earthquakes, floods, and hurricanes take a heavy toll on the mental health of the people involved, giving rise to anxiety, depression, aggression, irritability, sleeplessness and excessive vigilance [3]. Preliminary findings of their case study suggest that climate change is becoming an additional mental health stressor for resource-dependent communities. Climate change has led to trauma in affected people, giving rise to suicidal tendencies; as well as low confidence and weakened sense of worth. A review study climate change affects human health adversely in many ways from thermal stress, extreme weather events to infectious diseases and hunger prevalence. The United Nations Development Program's climate action goal aims to mobilize US \$100 billion annually by 2020 to address the needs of developing countries to both adapt to climate change and invest in low-carbon development. However, for achieving this goal people's participation with action orientated concerns for the environment will play an important role.

This is one of the first studies, to our knowledge, that explores the correlation between SKY, a yoga based breathing technique and the attitude towards climate change and connection with nature in Indian population [4]. This is of significance as yoga based techniques have been shown to enhance compassion, sense of connection and awareness towards one self but they have not been explored as a tool to create pro-environmental behaviors. This study aims to explore if the practice of yoga can correlate with attitudinal shifts towards climate change and environmental issues.

Previous research on SKY has demonstrated its positive effects on mental health. SKY has been shown to reduce depression and stress, improve life satisfaction, social connectedness and gratitude and an improvement in mental wellbeing with an increased degree of optimism. There is sufficient evidence to consider SKY to be useful as an adjunct treatment for depression disorders like Major Depressive Disorder (MDD) and Generalized Anxiety Disorder (GAD). In a randomized controlled trial at Yale University, when compared to other groups (Foundations of Emotional Intelligence and MBSR), SKY group showed the greatest impact, benefiting six outcomes: Depression, stress, mental health, mindfulness, positive affect and social connectedness. SKY could eminently enhance meta-awareness and compassion not just towards one's self but also towards the environment in which one resides.

Similar research on Mindfulness has also explored it as a climate action tool, by reducing the carbon footprint, increasing sustainable use of resources, shifting diet to healthy and plant-based food, and stimulating attentional awareness, openness, response flexibility and positive behavior change [5]. The results show millennials have a greater connectivity towards the environment than the older population. However addition of SKY practice is shown to enhance that connectivity. Similar trends are seen for the climate change attitude scale, where millennials show higher pro-climate change attitudes than older populations.

However as in the case of connectivity with nature, addition of SKY practice enhances the pro climate change beliefs and intentions significantly. This is important as it might indicate that SKY could be used as a tool to inculcate pro-environmental behavior and attitudes amongst younger populations. Adopting a meat free diet is increasingly being seen as a way to care for the planet and not just one's body. In our study we found a difference between the vegetarians and non-vegetarians in their attitude and connectivity towards environment and climate change. Interestingly while SKY practice could enhance this connectivity for the vegetarians we could not find any difference in the attitudes of people who follow a non-vegetarian diet. It was also seen that SKY practitioners scored significantly higher than non-SKY practitioners on the climate change intentions sub- scale, and not on the climate change beliefs scale. It could imply that even though most people are aware of the dangers of climate change, yoga practices like SKY could inspire one to make tangible changes in one's behavior and habits that might support the planet.

Conclusion

Findings from this survey suggest that yogic practices, especially Sudarshan Kriya Yoga help people to build strong relationships with nature and support pro-environmental behaviors. Sudarshan Kriya Yoga practitioners are more likely to make choices that support the planet and the environment. They are also more likely to take actions that may mitigate climate change. SKY has been shown to increase positive emotions like happiness and a sense of social connection. This sense of connectivity allows the practitioners to care more for the environment. SKY can be a useful tool for mobilizing people's participation in environmental conservation efforts. This study will help researchers to explore the reliability and utilization of yoga to mitigate climate change as well as to enhance the connectivity with nature in people.

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