International Day of Yoga
21 June

Yoga for Harmony & Peace

योगः कर्मसु कौशलम्

योग सन्देश

छठवें अन्तरराष्ट्रीय योग दिवस के उपलक्ष्य में प्रकाशित

प्रकाशक

महामना मालवीय मिशन, नेपाल

काठमाण्डू, नेपाल

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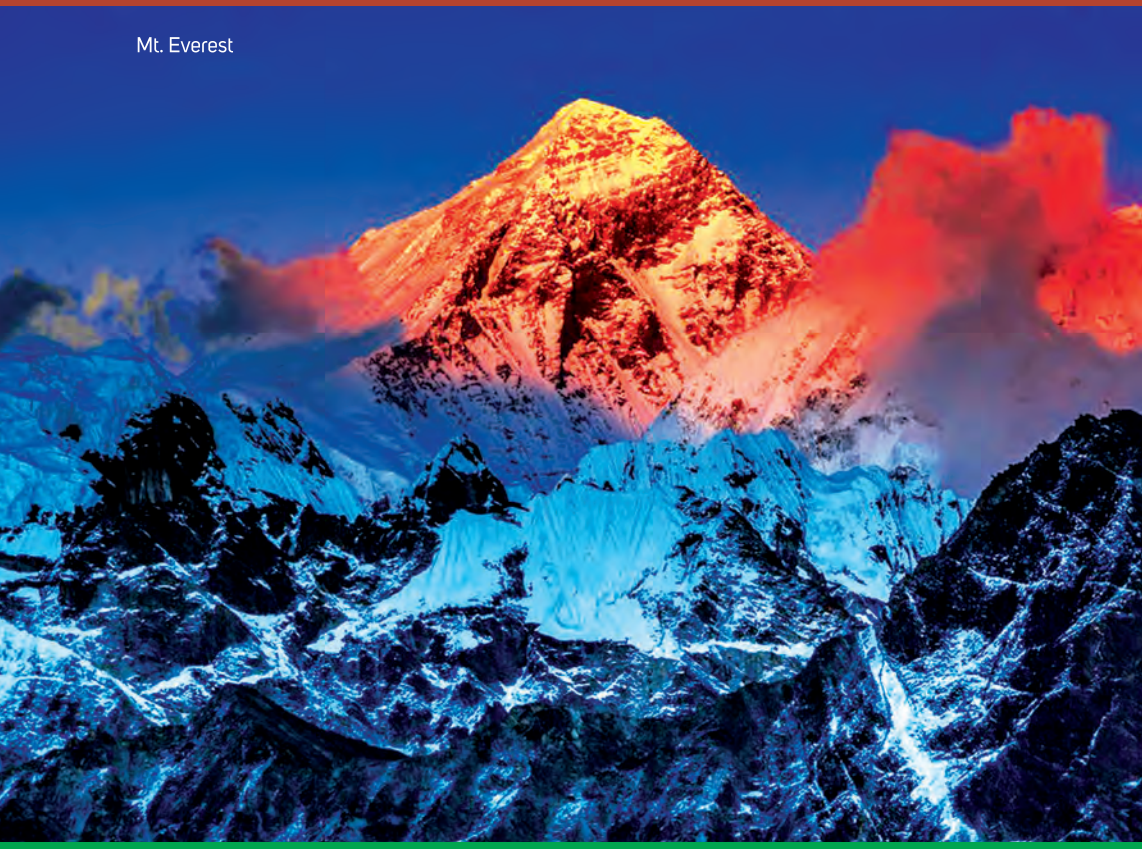

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योग सन्देश

(योग सम्बन्धी अनुसन्धानात्मक आलेख)

ग्रन्थ निर्माण समिति

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सम्पादक : जीवन चन्द्र कोइराला

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प्रकाशन सन्दर्भ	: छठवाँ अंतरराष्ट्रीय योग दिवस
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मुद्रण	: समा प्रिन्टर्स, भैंसेपाटी, ललितपुर, नेपाल

कवर तस्वीर : नेपाल र भारतका प्रधानमन्त्री अन्तर्राष्ट्रिय योग दिवसको उपलक्ष्यमा योग गर्दै।

Yoga as a Cardio Workout: Modern Perspectives for the Athletes


Dr. Vikram Singh, Dr. Navdeep Joshi

Abstract

Yoga is not considered as an apt cardio work out. To get a cardiac benefit from a yoga practice session, for example a 20 minutes of Sun Salutations (surya namaskara without chanting mantras) or a vigorous "engine run" as practiced in yoga for winters appears to be sufficient enough if done at least three days a week. It is important to understand the definition of cardio exercise which says that it is "a continuous and rhythmic exercise" in order to elevate heart rate above 100 beats per minute. It is important that the rest periods should not be there or minimum possible in between the repetitions. The pace should be between moderate to hard, but sustainable for at least 20 minutes. There are certain devices like wearing a simple heart rate monitor that can measure how hard the workout is. Generally for body fat loss, the yoga work outs are supplemented with cardio workouts, which will give our heart a workout, but needs to be carefully monitored for overweight and obese men and women especially. It is equally important though not to get drifted from one's own fitness goals besides enjoying several other health benefits offered by all types of yoga. If fitness is the only motivator to do yoga as a cardio workout then the person may not be able to get much benefit because yoga is much beyond strength and flexibility. It aims to promote high level consciousness.

Key words: Surya namaskar, Exercise, Cardio workout Yoga may not seem to be falling under the category of an endurance/cardio workout. Cardio is synonym to aerobic exercise which means sustained physical activity that increases the heart rate to a desired level as deemed correct for a positive effect on the performance.

As an essential component of health related as well as competition related physical fitness, the term "Cardiovascular fitness," also known as "cardio respiratory fitness," is not being used during often in a yoga class. For a sedentary person, it is the ability of the heart and lungs to utilize oxygen in an efficient way leading to a long, healthy life. For an endurance athlete like distance runner, a triathlete, cycler or a swimmer who aims to win needs to push himself/herself to the extreme during training and competition. The term used for endurance athletes is “cardio respiratory endurance”. It is the ability of the lungs, heart, and blood vessels to deliver adequate amounts of oxygen to the cells to meet the demands of prolonged physical activity that is high in volume and intensity. During prolonged exercise, an individual with a high level of cardio respiratory endurance is able to deliver the required amount of oxygen to the tissues easily. In case of unfit person, the cardio respiratory system has to work much harder; the heart has to work at a higher rate, less oxygen is delivered to the tissues, and consequently, the individual fatigues faster.

Any workout comprises of the following three primary components:

- Intensity- how hard one should train?
- Duration – how long?
- Frequency – how often?

The American Council of Exercise (ACE) and American College of Sports Medicine (ACSM), are leading organizations in the field of research and development in sports and exercise science. ACSM suggests corresponding numbers to achieve and maintain cardiovascular fitness in healthy adults. For example, one should aim for doing a workout between 65 to 80 percent of one’s maximum heart rate (intensity measured with heart rate as the primary factor), for at least 20 minutes (duration), three to five days per week (Frequency). Besides this the total volume (a combination of frequency and duration) of training and exercise is also important. Latest research suggests that the overall volume of exercise—and the balance of intensity, frequency and duration is more important

than merely focusing on intensity for sustained development and maintenance of good cardio respiratory endurance. This can be supplemented by combining high and low intensity workouts during preparatory and transition phases of periodization by the endurance athlete. Some trainers use yoga as a low intensity variety workout in cross training.

A low intensity yoga workout could be used to balance with longer duration and greater frequency to make it beneficial for the endurance athlete. A high intensity workout for shorter periods of time, or less frequently can be followed by yogic relaxation methods to enhance recovery.

In comparison to Vo2 max method and other expensive and time consuming ways, heart rate measure is more convenient and cost effective for the coaches to use and is fairly reliable measure of exercise intensity.

How to Determine Heart Rate Training Zone

Traditionally, exercise intensity has been prescribed as a percentage of maximum heart rate (calculated as 220 - age). For example, a 30-year old with a maximum heart rate of 190 beats per minute might train at 75% maximum or 143 bpm. The **Karvonen formula** uses the heart rate reserve to calculate training zones based on both maximum and resting heart rate.

1. 220- age = maximum heart rate (MHR)
2. HRR (heart rate reserve) = MHR - RHR (resting heart rate)
3. So training heart rate (THR) = (HRR X training %) + RHR

Suppose a 50 year old with a resting heart rate of 65 bpm who wants to train at 70% maximum

1. 220 – 50 = 170bpm (maximum heart rate)
2. 170 – 65 = 105bpm (heart rate reserve)

3. (105 x 0.7) + 65 = 139 bpm

4. (105 x 0.8) + 65 = 84 bpm

So this person's training heart rate should not be more than 139 bpm and less than 84 bpm.

There can be several standalone and mobile app related devices that are used for monitoring heart rate today. Unlike treadmills, cycles and rowing machines, yoga mats don't come with built-in heart rate monitors.

There are different styles of yoga that have evolved from traditional yoga only like Iyenger Yoga, Bikram yoga, Viniyas yoga etc. that rely upon HIIT (high intensity interval training) type of workouts with weight loss as the primary objective. Holding a posture for long will not elevate the heart rate enough and therefore does not qualify to be a cardio respiratory training method. But if the asana postures and modified to become vigorous with continuous movement, such as power yoga, surya namaskara, or some other high intensity practice such that it raises the heart rate beyond desire level as per norms, then it might be counted as a alternative method of developing general endurance. It might be too taxing on the joints for the overweight and unfit person to do surya namaskara in the first place.

American College of Sports Medicine recommends that the endurance exercise should be continuous, rhythmic and aerobic (in the presence of oxygen) and not anaerobic that uses large muscle groups. Plenty of weight loss yoga sessions fall within that description, but there isn't a consensus about their cardiac benefit, even among yoga teachers who teach similar styles. "Yoga isn't enough," says Sage Rountree, a yoga teacher and triathlon coach in Chapel Hill, North Carolina, and the author of The Athlete's Guide to Yoga. "Even a fast-paced vinyasa practice won't challenge the heart in the same way as running, swimming, or even fast walking." Research has shown that yoga increases

muscle strength and flexibility, there is dearth of studies on effects of yoga on cardiovascular system.

So there is no straight answer to whether yoga is a cardio workout or not because in the first place yoga in "work in" and not a "workout" as propounded in the yoga scriptures and it is aimed at "sthir sukham asanam" means to be in control, easily and happily without being taxed is asana. "Power Yoga as a training tool if you are an athlete can get your heart pumping, but it more useful because it calms the mind and balances the body and mind. Yoga helps to consolidate the resolve to continue training harder and regularly generally called exercise adherence.

New research in Complementary Therapies in Medicine indicate that yoga can meet the American Heart Association's cardio guidelines (which recommends 150 minutes of moderate aerobic exercise weekly), provided that the postures are done rapidly.

To study this, researchers at the University of Miami put sensors on 22 healthy adult men and women and asked them to do as many repetitions of sun salutations in eight minutes as possible to the point of failure. There were two speed options assigned: Participants would hold poses for three seconds each, or 12 seconds each. Results showed that those who flowed faster burned an average of 48 more calories during the session, compared to those who were on a 12-seconds-per-pose pace. Similarly Joseph Signorile, PhD, senior author of the study concluded that sun salutations (surya namaskara) at the faster pace are like interval training-explaining that the flow between poses can be thought of like little sprints, while the actual poses are like recovery.

Yet another method for recording of the intensity of a physical activity is the Metabolic Equivalent Task (MET) method. The energy cost of many activities has been determined, usually by monitoring the oxygen consumption (VO2 max) during the activity, to determine an average oxygen uptake per unit of time.

This value is then compared to the resting oxygen uptake. One MET is the energy expended at rest, two METs indicates the energy expended is twice that at rest, three METs is triple the resting energy expenditure, etc. As on date, the published research studies using MET (Metabolic Equivalent Task) of giving scores as per intensity level) on yoga as an effective cardio respiratory method are somewhat limited in that they were conducted mostly in fairly experienced Indian men or women practicing Yoga in American metropolitan cities who were relatively young, apparently healthy, and of normal body weight. The exception was for the Wii yoga studies that included Japanese and English adolescents and older individuals. Results cannot be therefore generalized to individuals who are obese or have some adverse health conditions, the elderly, or the young children. Future studies are needed to better understand how experience and individual variability influence the energy cost and intensity of yoga.

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THE EFFECTS OF SHORT TERM AND LONG TERM NAAD YOGA MEDITATION TRAINING ON MINDFULNESS IN UNIVERSITY STUDENTS

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ABSTRACT

Introduction: Meditation has been practiced since times immemorial consciously or unconsciously by the people from different origins and the trend has caught more attention of the researchers worldwide due to popularity of yoga in the recent years.

Method: Internet-delivered online NAAD yoga meditation training for 6 weeks was being imparted to the university level participants (n = 67) and were assessed before, during and after treatment, and their compliance with the intervention they received was tracked online. In the randomized controlled trail (RCT) study, the treatments were received at a time, place, and computer of the participants' choosing with the proviso that the training be completed live and online during each of 6 successive weeks (6 days a week with a 32 minutes session each day). The trait MAAS, a 15-item scale designed to assess individual differences in the frequency of mindful states over time questionnaire was being used as tool to assess dispositional (also known as trait) mindfulness amongst all the participants.

Results: Both a short term (3 weeks) as well as long-term (6 weeks) NAAD yoga meditation programs elicited a statistically significant improvement on MAAS scores (p<.000).

Keywords: MAAS, Mindfulness, Online, RCT

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1. INTRODUCTION

Due to uncertainty regarding jobs, career choice and goals besides environmental stressors, the students at the schools and colleges often undergo stress, tension and anxiety, more than anyone else perhaps.

Cost of treating psycho-somatic diseases requiring medical interventions pose double whammy for those who belong to middle and lower middle class. Even the otherwise well-off western countries have realized the importance of cost-effective

measures to tackle stress related disorders in order to overcome economic hardships. Due to many inherent benefits, mindfulness-based interventions like asana, meditation, naturopathy have received increased attention in the popular and professional literatures for prevention, promotion and the treatment of physical and psychological ailments. There is no shortage of evidence-based literature these days which suggests that they benefit healthy young adults as well as those experiencing distress by enhancing coping, reducing negative effects, and supporting physical vitality (Baer (2003) ; Baer et al. (2008) ; Grossman et al. (2004) ; Grossman et al. (2004)). Intervention of mindfulness training not only improves attention and performance (Mrazek et al. (2013)), but it can also imrove one's coping skills. In yoga literature, it is often stated that the five "Kleshas" (conflicts) will always be there and "avidya", which means ignorance will always be at the core of these conflicts. Mindfulness has been described as "the awareness or being present at the moment without being judgmental to the unfolding of the experiences moment by moment" (Kabat-Zinn (2003)). We are most of the time by virtue of our disposition tend to stay either in the past or worry about our future, that keeps our brain cells active all the time with hyperactive amygdala region of the brain. In naad yoga meditation, the practitioners are first made to practice few asana's (annamaya kosh), mindfully. They are then instructed to observe their breath and thoughts, feelings, and sensations without being reactive; refrain from elaborating mentally beyond their simple experience of the moment; and refocus on their immediate, subjective experience when their attention strays (Bishop et al. (2004) ; Kabat-Zinn (2003)). Meditation and relaxation appear to have similar effects on stress and self-reported spiritual experiences; however, mindfulness decreases rumination and increases positive states of mind more effectively than does relaxation (Jain et al. (2007) ; Zautra et al. (2012)).

2. PROCEDURE

Participants: Undergraduate and post graduate students (n = 67) from across Indian universities were recruited after advertising on the social media and contacting them through e-mails. The workshop was being conducted online for 6 weeks.

Table 1 Descriptive Statistics showing the mean age of students who volunteered to undergo NAAD yoga training

	N	Minimum	Maximum	Mean	Std. Deviation
Age	67	17	28	23.51	3.183
Valid N (listwise)	67				

Measure: The Mindful Attention Awareness Scale (MAAS)

The trait MAAS is a 15-item scale designed to assess individual differences in the frequency of mindful states over time. The scale is a 15 item (1-6 Likert scale) questionnaire to assess dispositional (also known as trait) mindfulness. The measurements from the MAAS tap consciousness related to self-regulation and various other

related areas of well-being. As a trait, it has been seen that some individuals are more proficient at putting themselves into a state of mindfulness than others. This scale is based around the understanding that all humans already have varied kind of personal internal and external experience, which is awareness. Better consciousness can be built through harnessing the focusing of that awareness, which initially starts from being attentive. As one progresses, the attention enhances to become awareness of current experience or the present moment. This scale intentionally excludes mood, attitude, and motivation to keep dispositional mindfulness neutral as a construct. Those scoring higher in mindfulness scale tend to report higher levels of pleasant affect, better self-esteem, optimism, self-actualization and resilience under trying conditions. Also, lower levels of neuroticism, anxiety, depression, and emotional conflicts are reported in those scoring higher in mindfulness.

Method: Participants were given a google form URL with all instructions and assessments were completed online. Assignment to training occurred in the order that they registered online. They were then given an introduction about what is the history and origin of NAAD and its effects on the humans. 100 persons registered initially but 67 remained after implementing the inclusion and exclusion criteria.

Participants were demonstrated warming up exercises (each day 4 to5 different yogic postures) for about 10 minutes. To track participant compliance in the mindfulness and relaxation conditions, users were required to keep their camera's on at all times. In the sitting position, they were then given training in selected pranayamas (bhastrika-kapalbhati kriya) followed by OM recitation- 10 minutes). Focusing on instructions being imparted and natures' music- 15 minutes (in lying down or sitting position as deemed confortable). Lastly, they were brought back to the starting stage with backward counting (7 minutes).

Total= 30 to 32 minutes program each day except Sundays (6 days per week) for 6 weeks.

The participants filled up the MAAS questionnaire on first day- after 3 weeks and upon completion of the 6 weeks of intervention. The subjects acted as their own controls. Repeated measures method using SPSS-25 version was being used to analyze the results.

3. RESULTS AND DISCUSSION

Table 2 Descriptive Statistics of MAAS score on 3 time points

	Mean	Std. Deviation	N
pre intervention	4.07	1.03	67
post 3 weeks training	4.18	1.00	67
post 6 weeks training	5.39	.62	67

Table 2 shows mean values of the participants on days-1 (4.07 ± 1.03), after 3 weeks (4.18 ± 1.00), and on the last day (5.39 ± .624), which was statistically even more significantly different to pre-training (p < .000). Therefore, we can conclude that both a short term (3 weeks) as well as long-term (6 weeks) NAAD yoga meditation programs elicits a statistically significant improvement in MAAS scores. The **Tests of Within-Subjects Effects** table tells us if there was an overall significant difference between the means at the different time points.

Table 3 Tests of Within-Subjects Effects

Measure: MAAS							
Source		**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**
time	Sphericity Assumed	71.587	2	35.793	137.78	.000	.676
	Greenhouse-Geisser	71.587	1.052	68.068	137.78	.000	.676
	Huynh-Feldt	71.587	1.054	67.911	137.78	.000	.676
	Lower-bound	71.587	1.000	71.587	137.78	.000	.676
Error(time)	Sphericity Assumed	34.291	132	.260			
	Greenhouse-Geisser	34.291	69.41	.494			
	Huynh-Feldt	34.291	69.57	.493			
	Lower-bound	34.291	66.00	.520			

From Table 3 we are able to discover the F value for the ”time” factor, its associated significance level and effect size (”Partial Eta Squared”). As our data violated the assumption of sphericity, we look at the values in the ”Greenhouse-Geisser” row (as indicated in bold text). It has been reported when using an ANOVA with repeated measures with a Greenhouse-Geisser correction, the mean scores for MAAS were statistically significantly different (F (1.052, 69.412) = 137.781, p < 0.000).

The results presented in the previous table informed us that we have an overall significant difference in means, but we do not know where those differences occurred. This table presents the results of the Bonferroni post hoc test, which allows us to discover which specific means differed. Remember, if your overall ANOVA result was not significant, you should not examine the Pair wise Comparisons table.

Looking at the Table 4 above, we need to remember the labels associated with the time points in our experiment from the Within-Subject Factors table. This table gives us the significance level for differences between the individual time points. We can see that there was a significant difference in MAAS score between post-training (after 3 weeks) and pre-training (p = 0.000), and between post-training (6 weeks) and after 3 weeks of training c, and also between pre-training and 6 weeks of training

(p = 0.000) on NAAD Yoga meditation. From the "Mean Difference (I-J)" column we can see that mindfulness was significantly higher at this time point.

Table 4 **Pair wise Comparisons**

Measure: MAAS						
(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	-.111*	.020	.000	-.160	-.063
	3	-1.318*	.108	.000	-1.582	-1.054
2	1	.111*	.020	.000	.063	.160
	3	-1.207*	.106	.000	-1.468	-.945
3	1	1.318*	.108	.000	1.054	1.582
	2	1.207*	.106	000	.945	1.468

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

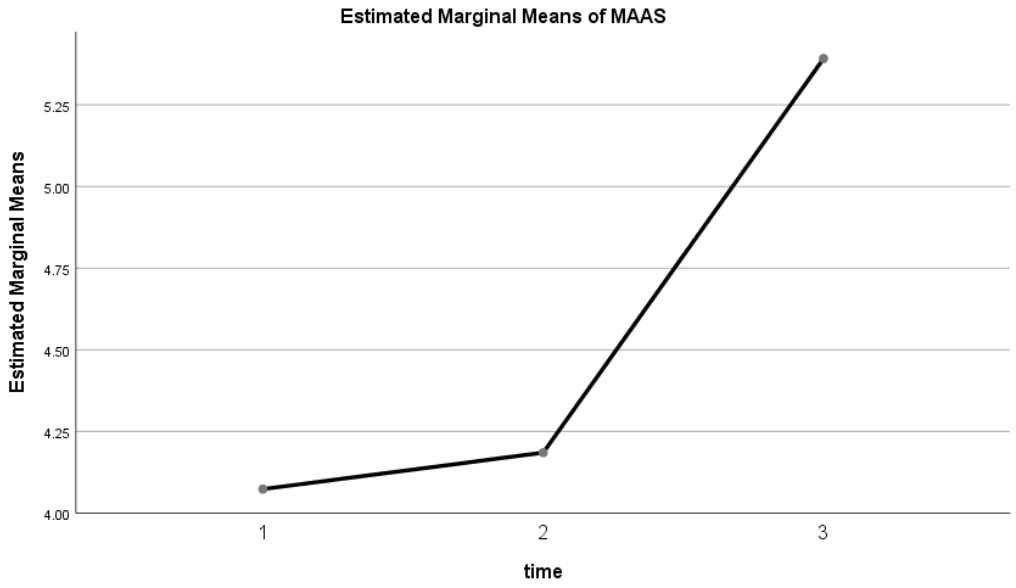

Figure 1 Profile Plot

This plot (Figure 1) is the last element to this analysis. It shows that the MAAS scores that represent the mindfulness were higher after 3 weeks of NAAD yoga meditation but even higher after 6 weeks of training, so the profile plot can be useful in gaining an easy understanding of the tabular results.

As per the student's witnesses, this study has additionally shown that meditation when taught online is equally effective in reducing stress and aiding coping for the

university students. Though, the primary goal was to determine whether short trem or long term NAAD YOGA mediation could improve mindfulness as measured by the the Mindful Attention Awareness Scale (MAAS) or not.. It did indeed do so in both long term and short-term training with large effect sizes, suggesting clinically meaningful change.

Supporting research studies have suggested that the effects of brief mindfulness training has been equally effective those of prolonged training (Carmody and Baer (2009) ; Vettese et al. (2009)). Our findings derive from a "traditional" version of NAAD YOGA meditation only and thus provide a non-confounded test of its effects. Some previous studies in which small group samples were being used had violated an ANOVA's independence-of-observation assumption but for our present study.

Our findings thus have important implications that can be easily generalized. Online mindfulness training is even more convenient and cost-effective wellness intervention. Such training is not only very simple to learn in progression but it can be provided universally, to a large community in need. In addition, NAAD yoga meditation can be an additional ingredient employed by biomedical scientists, therapists as a holistic approach in addressing complex problems to improve quality of life for chronically ill patients.

4. CONCLUSION

A repeated measures ANOVA with a Greenhouse-Geisser correction determined that mean MAAS scores differed statistically significantly between time points ($F(1.052, 69.412) = 137.781$, $p < 0.000$). Post hoc tests using the Bonferroni correction revealed that NAAD yoga meditation training elicited a slight but significant improvement in mindfulness from pre-training to 3-weeks of training (4.07 ± 1.03 vs 4.18 ± 1.00, respectively), which was statistically significant ($p = .000$). However, post-training MAAS scores had risen to $5.39 \pm .624$, which was statistically even more significantly different to pre-training ($p < .000$). Therefore, we can conclude that both a short term (3 weeks) as well as long-term (6 weeks) NAAD yoga meditation programs elicits a statistically significant improvement in MAAS scores.

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Comparison of Three Physically Active Groups on Perceived Stress during Covid-19 Lockdown

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Abstract
People adopt their own favorite activities in order to cope with stress and emotions. Choice of physical activity depends upon several factors like availability, socio-economic status, individual differences etc. The present study aims to evaluate the effect of activity type on perceived stress among a sample of subjects going through a transition period from unemployment to work during Covid-19 lockdown period. 96 participants, all males in the age group of 30 to 36 years (Mean age 32.82±1.91) were enrolled in this randomized controlled study (RCT), voluntarily. The three types of activity interventions, asana group (45 minutes-3 weeks), aerobics group (45 –minutes-3 weeks) and pranayama meditation (45 minutes-3 weeks) were compared on perceived stress score (PSS) to find out the impact of activity on their PSS scores. The non-parametric test, Kruskal-Wallis test provided very strong evidence of a difference ($p < 0.05$) between the mean ranks of at least one pair of groups. Dunn's pair wise tests gave a strong evidence ($p < 0.05$) of a difference between the group who practiced pranayama meditation and the group which did only the asana. No significant differences in mean ranks of asana and aerobics group, and the aerobics and pranayama meditation groups. Post pranayama meditation group displayed the lowest percentage of participants who fell in the low perceived stress range.

Keywords: perceived stress scale, type of activity, aerobics, asana, meditation

I. Introduction:

Yoga is an ancient science that includes asanas, breathing techniques and meditation as its integral components. Many research studies have reported beneficial effects of aerobics and yoga on psychological as well as physiological functions [1], [9], [10], [11]. Everyone faces a lot of competition at various stages of life which is one of the many reasons behind for stress-related metabolic disorder. Yoga and various other methods of staying fit are good remedies for alleviating stress and the cost-effective methods like yoga and meditation help to deal with stress and stress-related disorders to a great extent [4]. There are very limited studies that compare the 3 powerful methods (aerobics, asana, pranayama meditation) of stress management on perceived stress score. Hence, in the present study was being designed for 3 weeks training to 96 males from across India who enrolled voluntarily for only one out of the 3 choices of training as mentioned above. Much of literature on fitness and health focuses on the

impact exercise and yoga has on patients and their mood disorders, such as anxiety and depression [5]. The present study is an effort to fill these gaps in research studies about the level of stress an individual reports after practicing yoga or another form of exercise. There are several different forms of yoga being practiced and promoted by various yoga schools having minor ideological differences regarding the approach but the ultimate aim is same. The standard principles and contents of yoga are based on the ancient teachings, which include specific body postures (asanas), breathing techniques (pranayamas), and meditation (dhyana) [3]. The basic characteristics of all these yogic and aerobic fitness practices are more or less the same with some having greater to physical aspects on the other hand the practice like meditation tend to focus on purification of mind and thoughts as the priority approach to achieving excellence and well being.

II. Procedure:

Objective of this study was to see whether there are differences amongst the three types of training intervention groups (independent ordinal variables) on perceived stress scores using Perceived Stress Scale (PSS). The PSS variable is a score derived from responses to 10 items Likert scale on the magnitude of perceived stress (dependent variable).

This randomized controlled trial study was being carried out all over India with the total sample size of 96 using convenient sampling method. Inclusion Criteria was as follows:

- Healthy males only (without any co-morbidities)
- Age between 30 to 36 years (Mean age 32.82 ± 1.91)
- Normal body weight and height ratio

Exclusion Criteria was as follows:

- Subjects with Locomotor & Musculoskeletal disability
- History of Cardiovascular disorder
- History of Respiratory disorders
- History of Diabetes mellitus, Hypertension
- History of Major surgery in the recent past
- History of Drug intake
- History of Alcohol & Smoking

Perceived stress scale (PSS-10) by Cohen S, Kamarck T, Mermelstein R. (1983)[2] was being used as tool to collect post 3 weeks training of 45 minutes all days except on Sunday's as follows:

Group-1: Asana (total duration- 45 minutes with 10 seconds rest in between each posture. Warm up, standing postures – tadasana, tiryak tadasana, katichakra asana, yog mudra, sputa vajrasana, vakrasana, bhujangasana, chakrasana, makarasana, naukasana, pawan muktasana, shavasana (1 repetition each posture)

Group-2: Aerobics: 45 minutes low impact-15 minutes-high impact-15 minutes, cooling down-15 minutes (45 minutes total)

Group-3: Pranayama-meditation: "Kapalbhati kriya-Bhastrika-Anulom-vilom (10 minutes)" Yog Nidra (35 minutes)- as per Bihar School of Yoga protocol (Total=45 minutes)

The responses were collected by preparing the online google form of Perceived Stress Scale (PSS-10) and circulating it throughout India using social media because of covid-19 lockdown. Internal consistency reliability of the total perceived stress scale (PSS-10) scores by Cohen S, Kamarck T, Mermelstein R. (1983) was good (α = .714) that supports the use of the PSS-10 among Indian population. Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress.

- Scores ranging from 0-13 would be considered low stress.
- Scores ranging from 14-26 would be considered moderate stress.
- Scores ranging from 27-40 would be considered high perceived stress.

Hypothesis: Null (μ_0)

1. The post intervention perceived stress scores will have normal distribution across all the 3 groups.
2. There will not be significant differences between the 3 groups on perceived stress scores.

III. Results and Discussion

The data did not adhere to normality assumption, so non parametric test i.e. the Kruskal- Wallis test, which is the non-parametric equivalent to one-way ANOVA, was being used for comparing the mean rank of three different groups in the present experiment because neither of the dependent and independent variables was normally distributed.

Table-1: Descriptive statistics showing mean and standard deviation of all subjects (N=96).

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
Pre training PSS scores	96	29.47	4.56	20.00	38.00	25.00	30.00	33.00
Post training PSS scores	96	15.66	6.80	5.00	31.00	10.00	12.50	23.50

Table-1 shows that the pre training perceived stress score (PSS) for all the three groups was higher (29.47 ± 4.56) and after training it decreased to 15.66 ± 6.80. the minimum and maximum values and percentile scores are being displayed.

Table-2: Kruskal-Wallis Test

Ranks			
	Type of activity	N	Mean Rank
Pre training PSS scores	Asana	32	41.66
	Aerobics	35	52.63
	Pranayama Meditation	29	51.07
	Total	96	
Post training PSS scores	Asana	32	58.97
	Aerobics	35	47.96
	Pranayama Meditation	29	37.60
	Total	96	

Table-2 shows Kruskal-Wallis Test displaying mean rank scores of the training methods on PSS before and after training.

Table-3: Test Statistics[a,b]		
	Pre training PSS scores	Post training PSS scores
Kruskal-Wallis H	2.969	9.038
df	2	2
Asymp. Sig.	.227	.011
a. Kruskal Wallis Test		
b. Grouping Variable: Type of activity		

Table-3 shows the test statistics calculated by Kruskal-Wallis H test in which it was observed that there was a statistically significant difference was observed in perceived stress score between the three different groups, $\chi 2(2) = 9.038$, $p = 0.011$ ($p<.05$ level of significance), with a mean rank PSS score (post 3 weeks training) of 58.97 for Asana group, 47.96 for aerobics group and 37.60 for pranayama-meditation group. The pre-training PSS scores were not found to be statistically significant between th three groups, $\chi 2(2) = 2.969$, $p = 0.227$ ($p>.05$ level of significance), with a mean rank PSS score (before the beginning of 3 weeks respective group training) of 41.66 for Asana group, 52.63 for aerobics group and 51.07 for pranayama-meditation group.

Table-4: Hypothesis test summary using Kruskal-Wallis Test

Null Hypothesis	Test	Sig.	Decision
The distribution of post training PSS scores is the same across categories of Type of activity.	Independent-Samples Kruskal-Wallis Test	.011	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .050.

This 'Hypothesis Test Summary' box (table-4) is given for the for the Kruskal-Wallis test.
As $p < 0.05$, there is very strong evidence to suggest a difference between at least one pair of groups.

Fig-1: Box plot showing Kruskal-Wallis test for independent samples

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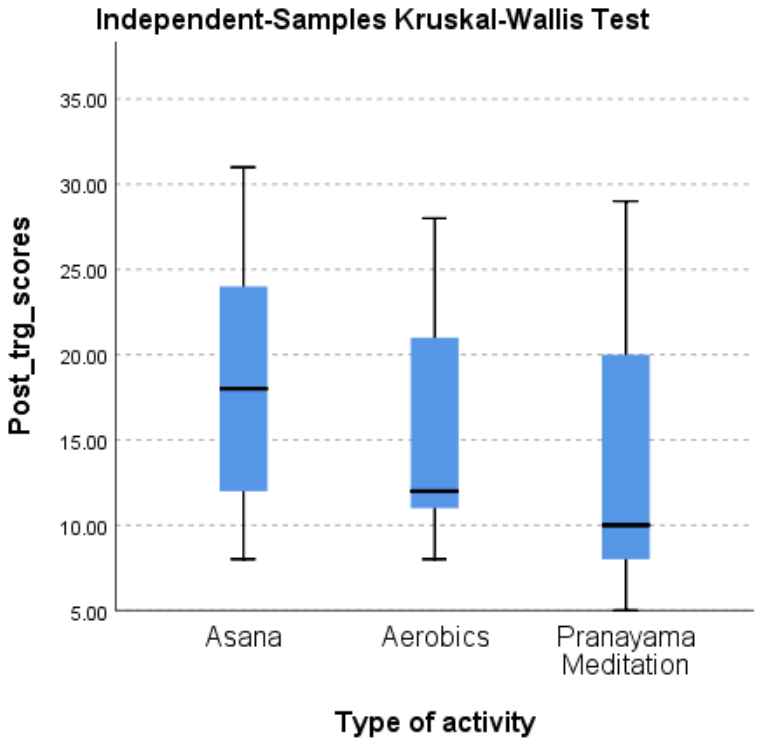

Figure-1 above shows that the pranayama meditation group had the lowest PSS scores after the 3 weeks training in comparison to the other two forms of training methods

Table-5: Pair wise Comparisons of Type of activity

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Pranayama Meditation-Aerobics	10.354	6.969	1.486	.137	.412
Pranayama Meditation-Asana	21.365	7.115	3.003	.003	.008
Aerobics-Asana	11.012	6.788	1.622	.105	.314

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

The pair wise comparisons table-5 shows the results of the Dunn-Bonferroni tests on each pair of groups.

Fig-2: Pair wise comparisons plot of type of activity intervention on perceived stress

The Adj. Sig column in table-6 makes the adjustments for multiple testing (using the Bonferroni error correction). Only the p-value for the test comparing the pranayama and asana groups is significant ($p < 0.05$). on the basis of above tables, it can therefore be said that the Kruskal-Wallis test provided very strong evidence of a difference ($p < 0.05$) between the mean ranks of at least one pair of groups. Dunn's pair wise tests were carried out for the three pairs of groups. There was very strong evidence ($p < 0.05$), adjusted using the Bonferroni correction) of a difference between the group who practiced pranayama meditation and the groups which did only the asana. The median perceived stress score for the group that did pranayama meditation was 9 compared to 22 in the group that did asana only. There was no evidence of a difference between the other pairs.

The present study compared the effectiveness of three types of training viz. asana, aerobics and pranayama-meditation on self-reported perceived stress scores of male subjects through online programs for three weeks. This study found that males who practice pranayama – meditation had a significantly lower perceived stress level than the males who were engaged in asana only and aerobics only training sessions. The null hypothesis was rejected. This finding aligned with the previous studies that concluded that yoga was more effective at decreasing negative mood than other forms of exercises [7]. However, the findings of present research were not in conformity with the [5] study, which found that individuals who participate in yoga had higher levels of depression and lower levels of quality of life in comparison with the walking group. The difference in findings could be attributed to the different tools and sample population being studied and our study was done online with online training that too during Covid-19 lockdown. More comprehensive offline research comparing males and females and using a larger sample size would be beneficial to determine as to which type of activity influences the perceived stress in better ways. Netz and Lidor (2003) in their study demonstrated that low intensity activities like yoga asanas and some aerobic activities like swimming, can improve mood in comparison to the other forms of exercise. Thus, because this current study did not determine if certain types of exercise or yoga influence perceived stress level more research on this would be needed. The limited sample size and large variety of different

exercises and types of yoga performed impacted the potential correlation of perceived stress and type of activity.

IV. Conclusion:

There is a dearth of studies that compare individuals who practice yoga with individuals who perform other forms of exercise in the Indian context during pandemic lockdown. The research that is available is done offline and consists of comparatively small samples in the age group of 30 to 36 years. The current study contributes to the already available literature due to the fact that it explored self-reported perceived stress of males who practiced 3 different forms of training. This current research results show that the males who practice pranayama and meditation have a significantly lower perceived stress score than males who perform asana and aerobics, which contributes to the inconsistent literature, presented thus far. These findings could be used to help yoga teachers, coaches and mental health professionals to develop insight and plan better scientific and systematic training programs for their clients who struggle with stress.

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Frontiers

Experimental and Quasi-experimental Designs in Yoga Studies: Review and suggestions for Prospective Yoga Research Scholars

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A B S T R A C T

Researchers have shown a great interest in empirical studies, review and meta-analysis publications on yoga from the last few years. This paper aims to review and simplify some of the common research designs that can be implemented in yoga as a practice, yoga for physical fitness and health function. Most of the studies involve yoga and its effects on fitness, health and psychiatric and medical conditions. These include frustration, intelligence, stress, obesity, fitness components like strength, flexibility, blood pressure, low back pain, asthma, diabetes, balance so on and so forth. It is important to understand that whether such studies have followed a proper yoga protocol, are they experimental or quasi-experimental designs or not. Whether there was control groups involved or not etc. As on date it is found that more randomized controlled studies are needed in which yoga is compared to active exercise groups. Physical and mental health benefits of yoga apart, it makes it ethically questionable to assign participants to inactive control groups. Shorter sessions need to be investigated for cost-effectiveness and for daily self practice or practice under controlled conditions by a qualified yoga instructor. It is important to understand that paper pencil tests that are implemented may not be much reliable and understandable when they are used with rural population and children below 13 years of age. It is also pertinent to conduct productivity audit of studies so that the cost involved in studies can be justified and to decide upon the course of action with regard to research designs that are model best practices that can be replicated by future researchers in yoga.

Yoga has been practised as a fitness exercise, for general health, as a therapy and many other applications. Yoga and related research studies have gained momentum in various universities and colleges in the recent past while pursuing masters and other research degrees. There is no doubt that Yoga has emerged as inter disciplinary field mainly concerned with health and fitness of masses and school children not only in India but all across the

world. People are desperately looking forward to a good teacher who is not only good in communication skills but also in yoga research study. It is neither easy not difficult to do good yoga research because every field is unique in itself and an upcoming discipline of yoga research has a lot of scope especially in the applied and inclusive settings. A research design is essentially a systematic blueprint that guides the collection and analysis of data. This write up is delimited to two main types of designs prevalent in Yoga studies that have been reviewed – Descriptive and experimental. Descriptive research focuses on how something works, whereas experimental research emphasizes what works.

A. **Descriptive Research Designs:** Descriptive research includes ethnographic studies and case studies among others. Studies often focus on understanding how a particular yoga program is implemented and how participants perceive their experiences and outcomes. These studies typically make use of qualitative information, such as client feedbacks, written responses, interviews and focus groups (high BP patients, back pain patients). A yoga teacher may use qualitative data to research the fluctuations in yoga asana performance. There the teacher would conduct interviews and observations in order to view the practitioner's behaviour and conclude the research. This type of work takes place in natural settings in most yoga classes (outside of a lab), so it has good external validity because it is more realistic without the subjects (practitioners) becoming conscious about they being tested/evaluated to a particular task thus giving a sound advice to other yoga instructors as well.

   For example, in a study on the impact of yoga tourism on tourists visiting kerala (Ambili K., Guest Lecturer, Department of Travel and Tourism Management, T K M College of Arts and Science, Kollam, Kerala, India, 2016) "The study delineates the major reasons that increase the suitability of Kerala for yoga practice, the source of information about destinations in Kerala, the kind of tourism which are preferred to be combined with yoga trips, and how long have the tourists been doing yoga in their lives and the impact of yoga in their lives. The study was carried out by a descriptive research design based on survey method. Averages, percentages, chi-square test and factor analysis were used for analyzing the study. The result showed that traditional system of yoga was the major reason for suitability of Kerala for yoga practices, friends, relatives and travel agents remain key persons in giving information to the yoga tourists, and yoga has a high positive impact on tourists' lives.

- Quantitative descriptive studies: These often use numeric data to examine the number and type of people who participated in a program. Data may be used to loosely interpret whether an individual's initial scores differ from his or her final scores after an intervention.

  Example: A study entitled "Feasibility, Acceptability, and Effects of Gentle Hatha Yoga for Women With Major Depression: Findings From a Randomized Controlled Mixed-Methods Study" (Patricia Anne Kinser et.al.,). Abstract: "Major depressive disorder (MDD) is a common, debilitating chronic condition in the United States and worldwide. Particularly in women, depressive symptoms are often accompanied by high levels of stress and ruminations, or repetitive self-critical negative thinking. There is a research and clinical imperative to evaluate complementary therapies that are acceptable and feasible for women with depression and that target specific aspects of depression in women, such as ruminations. To begin to address this need, we conducted a randomized, controlled, mixed-methods community-based study comparing an 8-week yoga intervention with an attention-control activity in 27 women with MDD. After controlling for baseline stress, there was a decrease in depression over time in both the yoga group and the attention-control group, with the yoga group having a unique trend in decreased ruminations. Participants in the yoga group reported experiencing increased connectedness and gaining a coping strategy through yoga. The

findings provide support for future large scale research to explore the effects of yoga for depressed women and the unique role of yoga in decreasing rumination.

Descriptive research is often used when researchers are studying a new program or intervention and its benefits and are less concerned with statistical results. Experimental studies, on the other hand, systematically test the relationship between a specific program or programs and a predetermined set of outcomes.

B. Experimental Research Designs in yoga:

1. Randomized Controlled Trials: Experimental studies in yoga and naturopathy are used to systematically test the effects of a particular yogic intervention/program. The most durable of experimental designs is the randomized controlled trial (RCT). Using this approach participants have an equal likelihood of being randomly assigned to either a comparative match group or a treatment group. Treatment and CM group participants are matched on a number of dimensions (e.g. age, gender, health/fitness level, years of practice or training, lifestyle, social-economic status so on and so forth) to make sure that the groups are relatively equivalent to each other (uniformity). The purpose of random assignment is to attempt to control for extraneous factors, or covariates (e.g. age, sex, health level, level of fatigue) that may unduly bias the results of a study. Most experimental studies divide participants into two or more groups. The treatment group (often called the experimental group) refers to the group of those participants who receive the primary intervention (i.e. yoga program or a particular in residence dietary regimen). Studies may have one or more of these groups, depending on the research objectives, however yoga researchers are typically interested in comparing a particular yoga program to a "no yoga" control condition.

   The control group refers to those who are not invited to participate in the active condition under investigation (e.g. yoga program) as part of a study. While many assume that control groups (CMG) are passive and do not receive any type of intervention, this is often not the case. Many studies use "active" controls.

   Example: A study comparing a yoga group to both a fitness schedule and to a no treatment condition. In this case the yoga group receives the treatment, the fitness group is an active control group that receives an exercise intervention, and the no treatment group receives no special instruction. Both the fitness and no treatment groups are considered control groups in this case. The use of a fitness group as a control allows researchers to assess whether differences between groups are related to fitness in and of itself, or the act of practicing yoga protocol.

   Randomized studies can use either a 'blind' or 'double blind' approach. In double blind studies, neither researchers nor participants know which condition (group) a participant has been assigned to. It is not easy to conduct double blind yoga research, as those engaged in practices that resemble yoga are likely to assume that they have been assigned to a yoga condition. It is much easier for an experimenter to have no idea as to group assignment, unless the experimenter is both the yoga instructor and the researcher examining the data. This is not an ideal situation, and should be avoided as far as possible.

C. Quasi-Experimental Designs:

Quasi-experimental designs are similar to randomized controlled trials in that numeric (quantitative) differences between intervention and control groups are emphasized. Unlike RCTs (Randomised Controlled Trials) however, these studies often use "convenience samples" or volunteers. In this approach, experimental groups often receive the yoga program as part of the formal study, and controls are placed on a waitlist and offered the program shortly after the formal research is completed.

Participants in these studies are not randomly assigned to either a treatment or

control group. This means that the two groups may differ greatly on one or more key dimensions (e.g. age, sex, prior yoga experience, health status), which may significantly impact group differences and statistical outcomes. It is critical to examine whether the treatment and control groups differ at baseline when interpreting the results of these studies. Generalizations in such studies are not possible and errors are likely to occur making it less reliable

Example: Effects of yoga on flexibility and balance: a quasi-experimental study (*Shah Noman Md Iftekher, Md Bakhtiar, Kh Shafiur Rahaman.* Aim of this research was to study the effect of yoga on flexibility and balance among shooting trainee athletes. 20 athletes took part in this study (10 in yoga group and other 10 in non-yoga group). Regular yoga sessions were being conducted early morning biweekly over a period of six weeks. All the participants were allowed to take part in regular training session, while only yoga group took part in additional yoga session. Measurements of flexibility and balance including Sit and Reach (SR) test and Stork Stand (SR) test were taken immediately before and after the yoga training period. Independent t-test and paired t-test were used to determine the significant effect of yoga within and between the groups before and after yoga training. Sixty percent of participants were male. Participant's age was between 12-17 years. All of them had normal level of BMI. Significant improvement were observed in the yoga group for flexibility (SR, P=0.017) and balance (SS, P=0.004) during within group comparison. No significant improvement was seen for flexibility and balance in the non-yoga group. Between group comparison (Yoga and Non-yoga) also shows significant enhancement in both flexibility (SR, P=0.018) and balance (SS, P=0.021). The findings helped the researchers to conclude that regular yoga training may improve the balance and flexibility of shooting athletes even within short period of time (6 weeks), can also improve the athletic performances that demands high flexibility and balance.

Conclusion:

Government is aptly making much needed efforts in the right direction to promote yoga that is an age old practice for the growth and development of mankind. In this emerging field it is essential to form multidisciplinary alliances between researchers and yoga teachers and therapists so that we can share our knowledge in the service of creating a strong evidence base for the use of yoga as a healthy lifestyle and as therapy. Although yoga research has grown exponentially in recent years, we are only now beginning to see studies that consistently make use of rigorous research designs and methods. Even though the field of yoga research has a long way to go, the future of systematic yoga researchers and teachers is bright.

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A STUDY OF PSYCHO-PHYSIOLOGICAL CORRELATES OF YOGA PRACTITIONERS AND SUBSEQUENT GENDER COMPARISON

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Abstract *Yoga practices have become increasingly popular due to government impetus in India and in western countries for leading a healthy lifestyle and as a method for coping with stress, tension, and anxiety. However, little is known about the innate physiological and psychological effects of yoga practice that are not visible with naked eye and requires usage of special equipment to see the yogic effects on human body and mind in an amplified form. In the present study, resting heart rate, electro dermal response (GSR), reaction time (simple visual and choice visual), hand steadiness, and eye hand coordination parameters were measured in the yoga practicing groups comprising of young male and female participants (N=40, Males=20, females=20) in the age group of 19 to 22 years to see the differences between males and females on these parameters. The females were superior to males in choice visual reaction time. There were no significant differences between male and female yoga practitioners with regard to their simple visual reaction i.e. when the single stimulus was being presented. Also there was no significant difference on hand steadiness between males and females.*

Keywords *Resting heart rate, electro dermal response, reaction time, hand steadiness, eye hand coordination*

INTRODUCTION

The psychological and physiological aspects of humans are so closely interwoven that the problem of psycho-physiological or psychosomatic disorders must be considered with attention to both aspects. Many physiological changes are induced while we respond to stress, tension, anxiety and arousal in our lives**:** sweating, blushing, gooseflesh, sexual arousal, weeping, the feeling of a 'lump in the throat' etc. It is obvious then, that when someone has a physical illness there are profound concomitant psychological factors that can materially affect the physiological factors. Psycho-physiology has emerged as a sub field of psychology and medicine that studies the relationship between mental activity and physiological functions. In other words, it investigates the mind-body connection in a scientific way. Professionals have been using the psycho-physiological approach in the training and rehabilitation of healthy and chronically ill persons. It is neither feasible nor ethical to compare men and women on physical correlates of sports performance, but yes certain parameters are worth studying as done in the present study in order to get further insight into performance prognosis and training techniques by coaches and trainers.

Psycho-physiological disorders thus affect many parts of the body, but certain organs and tissues seem more vulnerable than others. The digestive system, for example, is frequently beset by disorders that are psycho-physiological. Muscle cramps, recurrent stiff necks, backaches, and tension headaches are other common complaints, which may be reported by the patients in stressful situations. Psycho physiologists are thus interested in how mental characteristics affect the body. How does the person experience information from his/her body, exactly what happens when people experience particular emotions etc. Applied psycho-physiology is the discipline, which uses this information for practical purposes For example, psycho physiologists do research to find new ways to teach sports person better ways to learn to control body functions which may be causing performance deterioration or health problems and they also study ways to predict and prevent stress related problems of sports persons (Horn, T.E., Ed. 1992).

Thus it can be said that as researches continue to support the role of yoga in building and maintaining health, people in general are also interested in learning how they can apply related information to build skills and enjoy their activities more fully. These individuals become likely subjects for psychologists seeking to improve upon, promote healthy habits and prevent health related disorders.

PROCEDURE

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Random purposive sampling technique was used for sample collection. The yoga practicing groups from various yoga centres of Delhi state, comprising of young male and female participants (N=40, Males=20, females=20) in the age group of 19 to 22 years were tested to see the differences between males and females on resting heart rate, electro dermal response (GSR), reaction time (simple visual and choice visual), hand steadiness, and eye hand coordination parameters.

A. Yoga training: Following yogic techniques were daily practiced. • SukshmaVyayam (minor exercise) 3 minutes • SthulaVyayama (macro/major exercise) 3 minutes • Pranayam 5 minutes o Nadishodhan o Bhramari • Asanas (postures): 20 minutes o Suryanamaskar o Urdhvahastottasan o Katichakrasan o Konasan o Paschimottanasan o Vajrasan o Mandukasan o Gaumukhasan o Ardhamatsyendrasan o Padmasan o Dhanurasan o Bhujangasan • Shavasan: 2 minutes • Dhyana (meditation): 7 minutes "Om" chanting (2 minutes)-Total 42-45 minutes session. Unanimity, regularity and uniformity was ensured after discussion with the qualified yoga trainers of respective centres.

B. The testing of subjects was carried out for 6 weeks (5 days a week) at different yoga centers in Delhi and NCR. Following procedure was used for recording the responses-

i. ***Reaction time*** **-** The reaction time measured in the present study was Simple Visual Reaction Time (SVRT) and the choice visual reaction time (CVRT). The reaction time is the time between the end of stimulus presentation and onset of the response. The most -fundamental situation is one in which a single stimulus results in a single response and time taken to respond is known as Simple Visual Reaction Time. The situation where one has to produce a particular response in relation to a given set of stimuli or sequence of stimuli gives rise to what is known as the choice or complex visual reaction time. The room where the visual reaction time was measured was neat & clean & there were no any disturbing sounds or glaring lights. The subject sat comfortably in front of the tester. The machine has two partitions separated by a black screen. The subject sat close to the machine. The subject's side has got three lights viz. yellow green and red and their corresponding switches. The tester presses the reset button in his side to make all the readings on the digital panel meter, "zero". The sports person was explained about the switches to be pressed in response to one visual stimulus first and then to different types of visual stimuli. As soon as the person sees the light glow, she/he presses the button to switch the same light "off". For measuring Simple Visual Reaction Time only one type of stimuli is to be selected and the subject is clearly told to press a particular switch in response to the stimulus. For measuring complex/choice visual reaction time (CVRT), three types of stimuli are selected and the subject has to press the corresponding button only to switch off that particular light which is glowing. The total number of readings taken for both SVRT & CVRT was five each. The time taken in responding was displayed on the digital display, which was present on the side of the tester. Both Simple Visual and Complex Visual Reaction time are measured in milli-seconds. Each subject was given 5 attempts and three trials. The final reading was the average of three trials.

ii. ***Resting heart rate monitoring*** **-** The room, where pulse biofeedback monitor was kept was neat and clean and there was not any disturbing sound and glaring lights. The subject lied down in a comfortable position. The sports person should not have performed any vigorous exercise just before the testing. The highly sensitive transducers were wrapped on the tip of the person's fingers with the help of a Velcro tape. The subject was told to relax as much as possible on his own, keeping his eyes closed. The subject was told to stay still while his heart rate is monitored. The digital pane meter displayed the resting heart rate. The heart rate was measured in beats /min.

iii. ***Galvanic skin response (GSR)/ Electro dermal response (EDR)*** - The room, where the GSR monitor was kept was neat and clean and there was not any disturbing sound and glaring lights .The person lies in a comfortable position. The machine was kept in the "off" mode. The electrodes are placed on the fingertips of the subject by means of Velcro tape. Jelly was applied on the two electrodes to increase the sensitivity of the electrodes. The machine was switched on. The electronic meter displayed the GSR value of the subject in Kilo-ohms.

iv. ***Anticipation Time*** - The subject sat 2-3 feet away from the target lamp. The distance from the target lamp was kept constant. Subjects had to press the stylus button for their push button

response as soon as the light travelling on the rectangular metal pipe reaches the last light emitting diode (L.E.D.).

The runway speed was set to 3 mph.

- Select the warning light fore period at 3 seconds.
- Press RESET to prepare for a new trial.
- Press START to initiate a trial. After the fore period warning interval passes, the light sequence was travelling down the runway.

Each phase of trial was indicated by the special indicator lamps i.e. WARNING, RUN, FINISH, RESPONSE, special lamps, EARLY & LATE, indicated the direction of the subject's error. The tester resets the apparatus after each response. The digital L.E.D. timer indicates the early or late response duration. Each person was given three trials of 5 responses and the average value of all the three trials was recorded.

v. ***Hand steadiness testing*** - The subject sat comfortably in front of the tester. Initially the subject was told to insert the metal stylus into the hole number V of the metal plate. The instrument has been designed to measure one aspect of the psychomotor phenomena of steadiness. The subject's aim was to hold the stylus in the hole without touching the side for duration of 30 seconds and the errors within the stipulated time were recorded digitally. Each subject was given three trials on each hole and the average of the three trials was recorded.

RESULTS AND DISCUSSION

Descriptive statistics using explore option in SPSS 20 version was being computed for all the variables (N=40) and then separately for men (N=20) and women (N=20).

The Shapiro-Wilk test used for analyzing the normality of all the variables of data shows **Sig.** value under the Shapiro-Wilk column was found to be greater than 0.05. We can conclude that "overall" for all the individuals it is normally distributed. The same data from the same individuals but separately for men and women was also being analyzed to produce a Normal Q-Q Plot and Shapiro-Wilk column. It was concluded that the data appears to be normally distributed as it follows the diagonal line closely and does not appear to have a non-linear pattern. **Sig.** value under the Shapiro-Wilk column was again found to be greater than 0.05. We can conclude that after splitting the data into men and women still it is normally distributed.

Table-1: One sample t-test for the group of 40 yoga practitioners (combined) on their respective test values

Variable	M	SD	Test value	t (difference)	df	Sig. (2-tailed)	Interpretation
SIMPLE VISUAL REACTION TIME (in milli-seconds)	205.33	33.39	250.00	-8.46*	39.00	0.00	Significant
CHOICE VISUAL REACTION TIME (in milli-seconds)	244.48	33.02	280.00	-6.81*	39.00	0.00	Significant
RESTING HEART RATE (in beats /minute)	73.10	4.79	72.00	1.45	39.00	0.16	Not Significant
ELECTRODERMAL RESPONSE (in Kilo-ohms)	282.58	52.65	500.00	-26.12*	39.00	0.00	Significant
No. of early res (scale)	9.63	2.56	8.00	4.00*	39.00	0.00	Significant
No. of Late res (scale)	8.63	2.08	8.00	1.90	39.00	0.07	Not Significant
No. of errors in 5th hole (scale)	10.88	1.96	5.00	18.92*	39.00	0.00	Significant

*value is significant at .05 level.

Table-1 shows that there was significant difference in all the variables upon the test values except resting heart rate and number of late responses. We can say that the deviation was significant for all but one variable from the normal values as recorded for the sportspersons in the past. It can be therefore concluded that overall the group of 40 yoga practitioners was found to be inferior (if the term is acceptable) in all the 6 psycho-physiological variables than the sports persons average test values except in the number of late responses variable.

SIMPLE VISUAL REACTION TIME values for both the males and females combined together were significantly higher than the test value (avg. 250 milli-seconds).	Therefore null hypothesis that there will not be significant differences between the test value and the overall computed value of 40 yoga practitioners is rejected at 5% level ($p<.05$).
Similar trend was being observed for CHOICE VISUAL REACTION TIME (test value was 280 milli-seconds).	Therefore null hypothesis that there will not be significant differences between the test value and the overall computed

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	value of 40 yoga practitioners is rejected at 5% level (p<.05).
RESTING HEART RATE was found to be not statistically significantly higher than the test value of 72 beats/min for the males (M=70.41, SD 4.79)	Therefore null hypothesis that there will not be significant differences between the test value and the heart rate value of male yoga practitioners is accepted at 5% level (p>.05).
Electrodermal values of male and female practitioners combined together were found to be significantly lower than the normal (500 kilo-ohms) value.	Therefore null hypothesis that there will not be significant differences between the test value and the overall computed value of 40 yoga practitioners is rejected at 5% level (p<.05).
Number of early responses for males and females combined together was significantly higher than the normal values (maximum test values of 8 errors in 10 attempts).	Therefore null hypothesis that there will not be significant differences between the test value and the overall computed value of 40 yoga practitioners is rejected at 5% level (p<.05).
Number of late responses for males and females combined together was not significantly higher than the normal values (maximum test values of 8 errors in 10 attempts).	Therefore null hypothesis that there will not be significant differences between the test value and the overall computed value of 40 yoga practitioners is accepted at 5% level (p>.05).
Number of errors in 5th hole (measure of hand steadiness) was found to be statistically significantly higher than the test value of 5 errors for the males as well as females.	Therefore null hypothesis that there will not be significant differences between the test value and the overall computed value of 40 yoga practitioners is rejected at 5% level (p<.05).

Table-2: Gender wise Group Statistics showing mean, standard deviation, and standard error mean

Gender		N	Mean	Std. Deviation	Std. Error Mean
Experience in years	male	20	1.50	0.51	0.11
	female	20	1.55	0.51	0.11
Age	male	20	20.45	1.05	0.23
	female	20	20.00	1.17	0.26
SIMPLE VISUAL REACTION TIME	male	20	215.05	25.50	5.70
	female	20	195.60	37.93	8.48
CHOICE VISUAL REACTION TIME	male	20	259.25	27.07	6.05
	female	20	229.70	32.32	7.23
RESTING HEART RATE	male	20	70.40	4.79	1.07
	female	20	75.80	2.97	0.66
ELECTRODERMAL RESPONSE	male	20	318.70	34.97	7.82
	female	20	246.45	41.46	9.27
NO_OF_Early_resp	male	20	8.10	2.02	0.45
	female	20	11.15	2.13	0.48
NO_OF_Late_resp	male	20	7.80	1.88	0.42
	female	20	9.45	1.99	0.44
No_of_errors_in_5th_Hole	male	20	10.30	2.13	0.48
	female	20	11.45	1.64	0.37

Table-2 shows mean, standard deviation and standard error of the mean for male and female yoga practitioners. The mean values of females on SIMPLE VISUAL REACTION TIME, CHOICE VISUAL REACTION TIME was in the lower side (lower the better) in comparison with that of males. The resting heart rate was lower in males. Electrodermal response was on higher side in males. Number of early and late responses as also number of errors committed in the fifth hole was lower in males as compared to that of females. However, whether this difference is significant or not was being further tested by using two-sample independent t- test for the two unrelated groups.

One of the conditions for using the two-sample t-ratio for unrelated groups is that the variances of the two groups must be equal. Levene's test was used to test the equality of variances.

Table-3: Group statistics showing mean, standard deviation, mean difference, standard error difference, t-value, Levene's test of equality of variances

Gender	Mean	Std. Dev	Mean Diff	Std. Error Diff	t value	p-value/ Sig. (2-tailed)	Levene's Test for Equality of Variances

								f-value	p-value
Experience in years	male	1.50	0.51	-.05	.16	-.309	.759	.192	.664
	female	1.55	0.51						
Age	male	20.45	1.05	.4500	.35	1.280	.208	.001	.980
	female	20.00	1.17						
SIMPLE VISUAL REACTION TIME	male	215.05	25.50	19.45	10.21	1.903	.065	1.669	.204
	female	195.60	37.93						
CHOICE VISUAL REACTION TIME	male	259.25	27.07	29.55	9.42	3.134	.003	.184	.670
	female	229.70	32.32						
RESTING HEART RATE	male	70.40	4.79	-5.40	1.26	-4.283	.000	1.935	.172
	female	75.80	2.97						
ELECTRODERMAL RESPONSE	male	318.70	34.97	72.25	12.12	5.957	.000	.000	.986
	female	246.45	41.46						
NO_OF_Early_resp	male	8.10	2.02	-3.05	.65	-4.638	.000	.158	.694
	female	11.15	2.13						
NO_OF_Late_resp	male	7.80	1.88	-1.65	.61	-2.698	.010	.071	.791
	female	9.45	1.99						
No_of_errors_in_5th_Hole	Male	10.30	2.13	-1.15	.60	-1.914	.063	.432	.515
	female	11.45	1.64						

In the table-3, F-value is not significant for any of the 9 variables as the p-value is greater than .05 for all. Thus the null hypothesis of equality of variances may be accepted and it is concluded that the variances of the two groups are equal. Aditya Jain et.al. (2015) in their study entitled "A comparative study of visual and auditory reaction times on the basis of gender and physical activity levels of medical first year students" found that male medical students have faster RTs as compared to female medical students for both auditory as well as visual stimuli. Regularly exercising medical students have faster RTs when compared with medical students with sedentary lifestyles.

Contrary to the findings of our study, a review of the literature on the influence of gender on reaction time shows that in almost every age group, males have faster reaction times as compared to females, and female disadvantage is not reduced by practice(Noble et. al., 1964, Adam JJ et. al, 1999, Der G. et. al., 2006). Researches done by Misra et al.(2006) also showed that males responded faster than females. The male-female difference is due to the lag between the presentation of the stimulus and the beginning of muscle contraction. Nowadays the male advantage is getting smaller, possibly because more women are participating in driving and fast-action sports (Silverman IW, 2006).It was found in the present study (Table-3) that there were non-significant differences amongst regularly exercising male and female participants on Simple Visual Reaction Time.

It can be seen from the table that the value of t-statistics is not significant for:

a. Number of years of experience
b. Age
c. SIMPLE VISUAL REACTION TIME
d. Number of errors committed while holding the stylus in 5th hole for 30 seconds.

Thus the null hypothesis of equality of population means of two groups is accepted for above four variables and on the basis of present study's findings, it may be concluded that the there is no significant differences between the males and females on SIMPLE VISUAL REACTION TIME and number of errors in 5th hole.

It can be seen from the table that the value of t-statistics is significant (at .05 level) for:

a. Choice visual reaction time
b. Resting heart rate
c. Electro dermal response
d. Number of early responses
e. Number of late responses

Thus the null hypothesis of equality of population means of two groups is rejected for above five variables and it may be concluded that the there is significant difference between the males and females on choice visual reaction time, resting heart rate, electrodermal response, number of early and number of late responses.

CONCLUSION

This study found that the female participants had statistically significantly lower CHOICE VISUAL REACTION TIME (229.70 ± 35.32 milli-seconds) compared to male yoga practitioners (259.25 ±

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27.07milli-seconds), $t(38) = 3.13$, $p = 0.003$.So the females were superior to males in choice visual reaction time. Male participants had statistically significantly lower RESTING HEART RATE (70.40 ± 4.79 beats per minute) compared to female yoga practitioners (75.80 ± 2.97 beats per minute), $t(38) = 4.28$, $p = 0.000$. It can be said that the males were fitter than females. Male participants had statistically significantly higher ELECTRODERMAL RESPONSE (318.70 ± 34.97 kilo-ohms) compared to female yoga practitioners (246.45 ± 41.46 kilo-ohms), $t(38) = 5.95$, $p = 0.000$. It can be said that the males were more relaxed, calm and peaceful than females. Male participants had statistically significantly lesser no. of early responses (8.10 ± 2.02) compared to female yoga practitioners (11.15 ± 2.13), $t(38) = 4.63$, $p = 0.000$. It can be said that the males were less over aroused than females. Male participants had statistically significantly lesser no. of late responses (7.80 ± 1.88) compared to female yoga practitioners (9.45 ± 1.99), $t(38) = 2.69$, $p = 0.01$. It can be said that the males were less under aroused than females.

There were no significant differences between male and female yoga practitioners with regard to their reaction times when the single stimulus was being presented to the two groups. Also there was no significant difference on hand steadiness between males and females. Upon extensive literature search, it was found that there are no randomized prospective studies comparing other than reaction time variables among male and female yoga practitioners.

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EFFECT OF SHORT AND LONG DURATION NADA YOGA MEDITATION ON HEART RATE OF PARA YOGA ATHLETES

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ABSTRACT

Introduction: Heart rate is a fairly good indicator of health-related physical fitness and is often used by fitness and yoga trainers before, during, and after their training sessions. “Divyang Jana”, a term often used to refer to persons with disabilities (PwD) are equally and sometimes more prone to having elevated heart rates because of external and internal conditions beyond their control. This study was undertaken to evaluate the role of NADA Yoga Meditation (22 minutes) in improving the important physiological parameter heart rate (HR) in visually impaired (VI) para yoga athletes of Uttarakhand.
Method: 52 para-yoga athletes were divided into two groups of which one group did Meditation and the other did not. HR-1 (pre-intervention, HR-2- after one week, and HR-3 after 2 weeks of the intervention were measured in beats per minute offline (first week) and online (second week) NADA meditation training.
Result: At the end of the study significant decrease in HR-2 and HR-3 was seen in the para yoga sports persons who practiced Meditation as compared to the non-practicing group (control group) after controlling for the covariate HR-1 (pre-intervention heart rate).
Discussion: The results were interpreted using MANCOVA and concluded that NADA yoga meditation was effective in reducing the heart rate mediated anxiety levels of yoga para-athletes in just 2 weeks and was found to be effective not only in just a week but also after 2 weeks of NADA Yoga meditation training done for 22 minutes each. Further, it can be argued that NADA yoga meditation may modulate the physiological response to stress via neurohumoral activation as displayed by the fairly good indicator namely heart rate.

Keywords: NADA Yoga Meditation, Para Athletes, Heart Rate

1. INTRODUCTION

Yoga asana has been recognized as a sport in the recent past and not only has there been a rise of abled contenders, but also disabled people have started competing at various levels in competitions designed for them to perform and win. Sports training principles and philosophical aspects of yoga are combined to understand the outcomes of asana and pranayama practices besides other

important psycho-physiological variables like respiration rate and heart rate. These important and simple-to-measure tools assist athletes and coaches to gauge the intensity of training making it pertinent to therefore understand the metabolism amongst disabled people at different times of the day and its significant implications due to its link with sleep, health, stress, and fatigue, ultimately determining the rest and recovery for better performance not only in the competition but during the recovery and rest phases.

Yoga and meditation studies have proven to be extremely efficient in improving basal and resting heart rate, but this holds true mostly for the healthy population. It is important to know how yoga by being a way of life, characterized by balance, health, harmony, and bliss, Nagendra and Nagaratna (1977) Meditation as the seventh limb of Ashtanga yoga Taimini (1961) is the state of alert rest for all as stated by Maharshi Mahesh Yogi Yogi (1972). Mastering the skill of meditation sooner can lead to healing and improved concentration and for the Divyang Jans to stay focused on the task without worrying about their condition. Over a period of time, the super consciousness also called the Samadhi Wallace et al. (1971), Wallace and Benson (1972) can be achieved which in turn paves the way for changing the outlook from being a victim or a sufferer to being a divine personality. This feeling may not be making the "Divyang Jans" outperform others in other fields of expertise but can certainly play an important role in convincing "Divyang jans", their coaches, and parents to always be positive and progressive.

Studies conducted on heart health clearly show that daily meditation practice can improve blood circulation, lower the heart rate, and facilitate maintaining a healthy heart Charu and Nadayoga (2019). Nada Yoga finds a detailed mention in ancient Indian literature. Nada means vibration and Yoga means Union between the two subtle but powerful psychic and spiritual entities. Nada Yoga meditation is the technique of the union of the individual mind with cosmic consciousness through the flow of vibrations. Nadanusandhan is a technique of Nadopsana, which is aimed at attaining the acquaintance of ultimate truth in hatha yoga. The technique of Nada yoga was originally propounded by Guru Goraksnatha:

'proktam goraksanathenam nadopasanamucyate' Hathapradipika (n.d.) - IV/65) - Hathapradipika

and is reflected as the best of all the Layas (means of flow of mind) as mentioned by Sri Adinatha:

sri adinathena sapadakotilayaprakarah kathita jayanti / nadanusandhanakamekameva manyamahe mukhyatamam layanam// (Hathapradipika (n.d.)-IV/66, Hatharatnavali(n.d.)-IV/5, 15)

With this background, the present study was conducted to know if there is any effect of nada yoga meditation on the heart rate of Divyang Jana active sadhakas as compared to those in the non-practicing active group.

2. METHODOLOGY

This study was undertaken to analyze the effect of 22 minutes of NADA Yoga Meditation practice in improving the important physiological parameter heart rate (HR) amongst the visually impaired (VI) para yoga athletes of Uttarakhand state in India. 52 para yoga athletes were divided into two groups of which one group did Meditation and the other did not. HR-1 (pre-intervention, HR-2- after one week, and HR-3 after 2 weeks of the intervention were measured in beats per minute offline (first week) and online (second week) NADA meditation training.

Hypothesis

μ_0 = null hypothesis = There is no significant difference between the heart rates of control and experimental groups after 1 week and after 2 weeks, 22 minutes of NADA yoga meditation while controlling for pre (before the intervention is administered) intervention heart rate.

The objective of the study was to compare the adjusted mean scores of control and experimental groups by considering pre-intervention heart rate scores as covariates. A 22 minutes NADA Yoga meditation session was conducted for 2 weeks (one week offline and one week online) and the heart rates of para-yoga athletes were measured while controlling for the pre-intervention heart rate variable (HR-1). The researcher recruited 52 participants who were subsequently randomly divided into one of two groups, the experimental and the comparative match groups. There were 25 participants in the experimental group and 27 in the comparative match group. The heart rate for each participant was measured three times, pre-intervention, after 1 week and after 2 weeks.

It was expected that the heart rate will improve to a certain extent after 1 week but will certainly improve after 2 weeks. However, the researchers are aware that initial heart rate values have an important effect on post-intervention heart rate values. As such, the researcher wanted to control for differences in the pre-intervention heart rate values of participants. Pre-intervention heart rate and NADA yoga meditation training were the independent variables.

In SPSS Statistics, we created five variables: (a) the two continuous dependent variables, Heart rate-2, heart rate-3; (b) the categorical independent variable, group, which has two groups: "comparative match group", "experimental group"; and the covariate, HR-1 (pre-intervention heart rate). One-way MANCOVA was being carried out as a statistical measure to study the heart rate variables of the para yoga athletes.

3. RESULTS AND DISCUSSION

Table 1

Table 1 Descriptive statistics

Overall Descriptive Statistics			
	Mean	**Std. Deviation**	**N**
Age	20.2500	2.90284	52
HR1	68.9231	5.46234	52
HR2	66.4808	4.75061	52
HR3	63.0192	5.44308	52

Table 1 shows the mean and standard deviation scores of the basic demographic variable- age and heart rate measured values 3 times mentioned as HR-1 (pre-intervention), HR-2 (after one week), and HR-3 (after 2 weeks) of the intervention was being measured in beats per minute offline (first week) and online (second week) NADA meditation training.

The control group comprised of 25 para yoga athletes and the experimental group had 27 para yoga athletes.

Table 2

Table 2 Group wise Descriptive Statistics

	Group	Mean	Std. Deviation	N
HR2	Exptl	65.8400	4.45047	25
	Ctrl	67.0741	5.02246	27
	Total	66.4808	4.75061	52
HR3	Exptl	59.4400	3.39215	25
	Ctrl	66.3333	4.87537	27
	Total	63.0192	5.44308	52

Homogeneity of regression, linear relationship and homogeneity of variance was being pretested and found not being violated using Levene's test and scatter plots as below:

Table 3

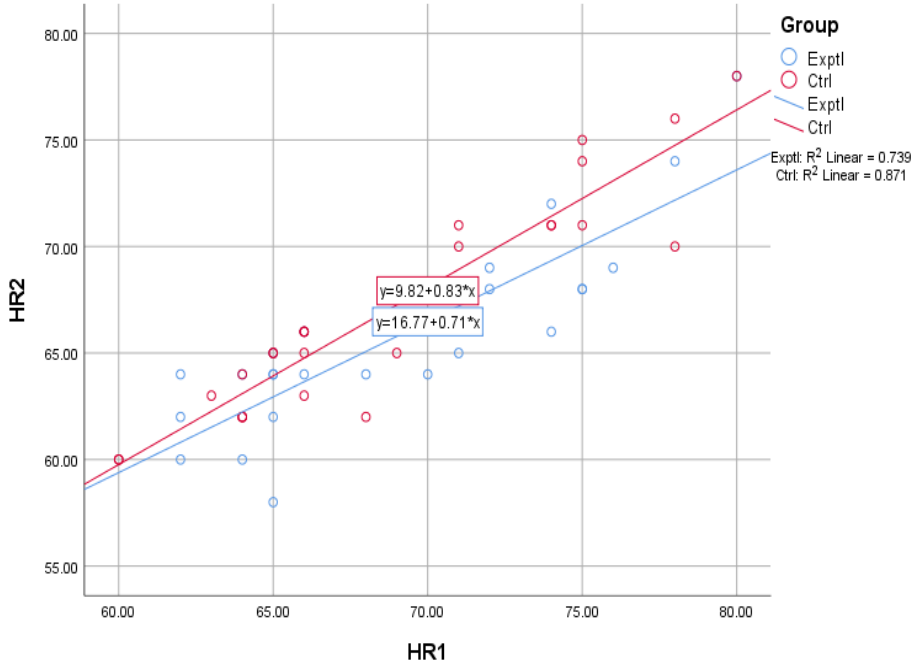
Table 3 Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
HR2	3.029	1	50	.088
HR3	2.487	1	50	.121

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + HR1 + Group

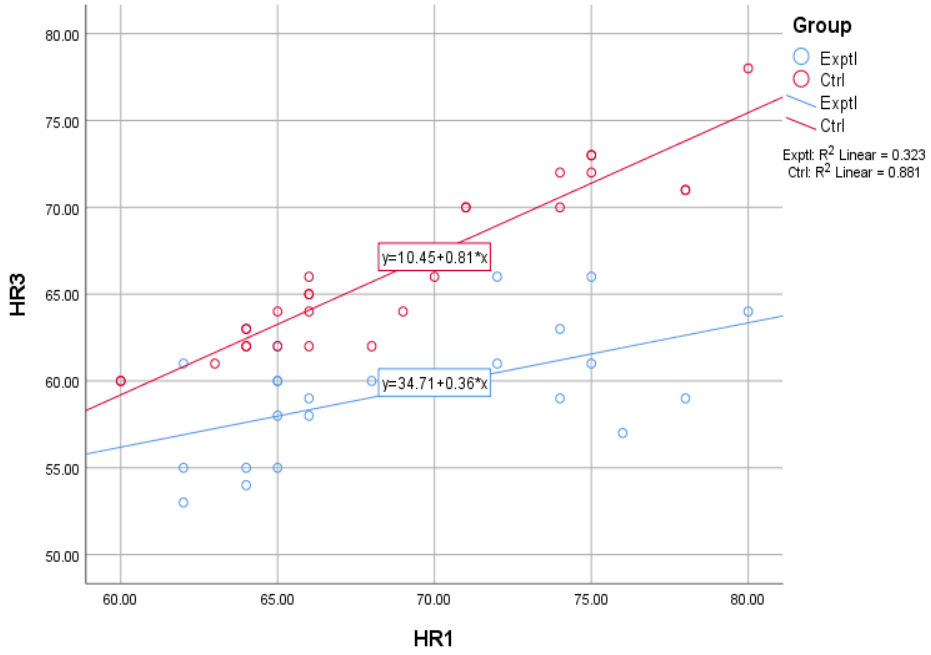
Graph 1



Graph 1 Homogeneity of linear relationship assumption

Homogeneity of linear relationship assumption between the covariate (HR-1) and the dependent variable (HR-2) is not being violated as seen in Graph 1

Graph 2



Graph 2 Homogeneity of linear relationship assumption

Homogeneity of linear relationship assumption between the covariate (HR-1) and the dependent variable (HR-3) is not being violated as seen in Graph 2

One-way MANCOVA in the present study was found to be statistically significant, this suggests that there is a statistically significant adjusted mean difference between the groups of the independent variable in terms of the combined dependent variable (after adjusting for the continuous covariate).

It would suggest that the combined mean scores of our dependent variables – HR-2 and HR-3– which have been adjusted for the continuous covariate, HR-1, differ between the two groups of our independent variable, group (i.e., the experimental and comparative match groups). Subsequent interpretation of the results from the one-way MANCOVA has been highlighted below:

Table 4

Table 4 Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.337	12.182[b]	2.000	48.000	.000	.337
	Wilks' Lambda	.663	12.182[b]	2.000	48.000	.000	.337
	Hotelling's Trace	.508	12.182[b]	2.000	48.000	.000	.337
	Roy's Largest Root	.508	12.182[b]	2.000	48.000	.000	.337
HR1	Pillai's Trace	.823	111.381[b]	2.000	48.000	.000	.823
	Wilks' Lambda	.177	111.381[b]	2.000	48.000	.000	.823

Group	Hotelling's Trace	4.641	111.381[b]	2.000	48.000	.000	.823
	Roy's Largest Root	4.641	111.381[b]	2.000	48.000	.000	.823
	Pillai's Trace	.659	46.421[b]	2.000	48.000	.000	.659
	Wilks' Lambda	.341	46.421[b]	2.000	48.000	.000	.659
	Hotelling's Trace	1.934	46.421[b]	2.000	48.000	.000	.659
	Roy's Largest Root	1.934	46.421[b]	2.000	48.000	.000	.659

a. Design: Intercept + HR1 + Group

b. Exact statistic

SPSS Statistics has also reported an **effect size** called **partial eta squared** (i.e., partial η^2). At present, there are no agreed upon definitions of what constitutes a strong (or otherwise) effect size Huberty and Olejnik (2006).

There are statistically significant differences in the experimental and comparative match groups in terms of the combined post-intervention heart rate variables, after controlling for the pre-intervention heart rate variables., F (2, 48) = 46.221, p < .001, Wilks' Λ = .341, partial η2 = .659.

Table 5

Table 5 Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	HR2	936.703[a]	2	468.352	107.100	.000	.814
	HR3	1172.413[b]	2	586.206	84.840	.000	.776
Intercept	HR2	53.173	1	53.173	12.159	.001	.199
	HR3	143.226	1	143.226	20.729	.000	.297
HR1	HR2	916.934	1	916.934	209.680	.000	.811
	HR3	555.592	1	555.592	80.409	.000	.621
Group	HR2	27.981	1	27.981	6.399	.015	.116
	HR3	649.442	1	649.442	93.992	.000	.657
Error	HR2	214.278	49	4.373			
	HR3	338.568	49	6.910			
Total	HR2	230975.000	52				
	HR3	208025.000	52				
Corrected Total	HR2	1150.981	51				
	HR3	1510.981	51				

a. R Squared = .814 (Adjusted R Squared = .806)

b. R Squared = .776 (Adjusted R Squared = .767)

Table 5 showing tests of between-subject effects indicates that there is a significant univariate outcome for heart rate measured after 1 week (HR-2) (F (1, 49) = 6.399, p = .015) and heart rate measured after 2 weeks, HR-3 (F (1, 49) = 93.992, p = .000) across group status. There was a further need to explore the source of the main effects across the groups, using post hoc analyses. The effect-size measure indicated that 11.6 percent of the total variance in HR-2 and 65.7 percent

of the total variance in HR-3 is explained by the independent variable (group) when removing the effect of HR-1 and interactions between them.

Table 6

Table 6 Estimated marginal means (adjusted mean scores of heart rates) after applying the covariates

Dependent Variable	Group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
HR2	Exptl	65.718[a]	.418	64.877	66.559
	Ctrl	67.187[a]	.403	66.378	67.996
HR3	Exptl	59.345[a]	.526	58.288	60.402
	Ctrl	66.421[a]	.506	65.404	67.438

a. Covariates appearing in the model are evaluated at the following values: HR1 = 68.9231.

Adjusted mean scores of heart rates (HR-2, HR-3) after applying the covariates table shows mean and standard error values of both experimental and comparative match groups on heart rate 2 and heart rate 3 dependant variables. The adjusted HR-2 mean score of experimental groups showed more decline in the heart rate from HR-2 (65.718) to HR-3 (59.345) as compared to the control group.

Upon pair-wise comparison of the experimental and comparative match groups, it was observed that there was a significant difference between the adjusted mean values of experimental and control groups on the heart rate variables (HR-2, HR-3) after controlling for the HR-1, i.e the initial value (P=.015) after 15 minutes and P=.000 after 25 minutes of NADA yoga intervention in the comparative match groups and experimental groups. Thus, the null hypothesis that there is no significant difference between the heart rates of control and experimental groups after 1 week and after 2 weeks of NADA yoga meditation while controlling for pre (before the intervention is administered) intervention heart rate stands rejected. Further, the adjusted mean heart rates of para-yoga athletes decreased significantly from 68.92 beats/minute to 65.71 b/m after 1 week and further lowered to 59.34 b/m after 2 weeks for the experimental group. Upon pairwise comparison, it was seen that the drop-in heart rate as a result of NADA yoga meditation session (22 minutes) for 2 weeks resulted in a significant decrease (p=0.015 and p=.000) in adjusted mean scores of heart rates. It can therefore be concluded that short duration (22 minutes) and short term (just 1 to 2 weeks) NADA yoga meditation was effective in reducing the heart rate- mediated anxiety levels of yoga para-athletes. In the study Peng et al. (2004) that was designed to quantify and compare the instantaneous heart rate dynamics and cardiopulmonary interactions during a sequential performance of three meditation protocols with different breathing patterns, it was found that different meditation techniques produce low-frequency heart rate oscillations.

CONFLICT OF INTERESTS

None.

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None.

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शिक्षाप्रियदर्शिनी

अन्तराष्ट्रिया समकक्षव्यक्ति-समीक्षिता
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प्रकाशकः
संस्कृतसंस्कृतिविकाससंस्थानम्
बाडी, धौलपुरम्, राजस्थानम् – 328021

शिक्षाप्रियदर्शिनी-शोधपत्रिकायाः सामान्यनियमाः

- शिक्षाप्रियदर्शिनी-शोधपत्रिकायाः मुख्यसंरक्षक- संरक्षक- प्रधानसम्पादक- प्रबन्धसम्पादक- सम्पादकसमीक्षक- परामर्शकादिसमस्तपदानि अवैतनिकानि सन्ति।
- शिक्षाप्रियदर्शिनी-शोधपत्रिका देश-विदेशस्थानां विद्यार्थिनां शोधार्थिनां शिक्षाविदां विभिन्नविषयविशेषज्ञानाञ्च शोधप्रक्रियाधारितानि गुणवत्तापरकज्ञानपूर्णानि शोधपत्राणि आमन्त्रयति।
- शोधपत्राणां प्रकाशनं सम्पादकस्य सम्पादकमण्डलस्य वा संस्तुत्याधारेण भवति, यत्र शोधसामग्र्या समस्तमुत्तरदायित्त्वं लेखकस्यैव भविष्यति। सम्पादकमण्डलं लेखकस्य मतस्य समर्थनं न करोति। अत्र अवधेयमस्ति यत् कस्यापि धर्म-जाति-सम्प्रदायविशेषस्य विरोधे लिखितलेखाः स्वीकृताः न भविष्यन्ति।
- सम्पादकमण्डलं शोधपत्राणि किञ्चिद् परिवर्तनपूर्वकं प्रकाशयितुमधिकारि भविष्यति।
- सम्पादकेन सम्पादकमण्डलसदस्यैः समीक्षकैः वा अस्वीकृतलेखाः न प्रकाशयिष्यन्ते, विषयेऽस्मिन् तेषामेव निर्णयः अन्तिमः भविष्यति। अस्वीकृतलेखाः लेखकं प्रति न प्रेषयिष्यन्ते।
- शिक्षाप्रियदर्शिनी-शोधपत्रिकायां प्रकाशितानां शोधपत्राणां देश-विदेशानां शोधसंस्थाभिः विश्वविद्यालयैश्च अस्वीकृतौ प्रकाशक-सम्पादक-सम्पादकमण्डल-मुद्रकादीनां किमपि उत्तरदायित्त्वं नास्ति।
- अग्रिमाङ्कप्रकाशनात्परं पूर्वतनाङ्कस्य सामग्री दुरुपयोगनिवारणाय नष्टा करिष्यते।
- शिक्षाप्रियदर्शिनी-शोधपत्रिकया सम्बन्धितस्य कस्यापि विवादस्य कृते न्यायिकक्षेत्रं राजस्थानस्य धौलपुरजनपदबाड़ीतहसीलन्यायालयस्य निर्णयः मान्यश्च भविष्यति।
- शिक्षाप्रियदर्शिनी-शोधपत्रिकायां शोधपत्रप्रकाशनार्थं लेखकाः शोधप्रक्रियाधारितलेखान् 5-7 पृष्ठेषु (2000-3000 शब्देषु) संस्कृत-हिन्दीभाषयोः Unicode-Kokila तथा च आङ्ग्लभाषायाः Timse New Roman (Size 14) लिपिषु टङ्कणं विधाय सी.डी. (मुद्रितपत्रसहित) अथवा ई-मेल माध्यमेन स्वकीय नाम-पत्रसङ्केत-चलदूरभाष-ईमेलसहितं प्रेषयेयुः।
- शोधपत्रे प्रायः 150 शब्दानां शोधसंक्षिप्तिका (Abstract), मुख्यशब्दाः (Keywords), सन्दर्भाः (Refferences) न्यूनातिन्यूनं 15, अन्ते सन्दर्भग्रन्थाश्च भवेयुः।
- सन्दर्भाः लेखकनाम-ग्रन्थनाम-व्याख्याकारनाम/टीकाकारनाम-प्रकाशकनाम-स्थल- वर्षसहितं पृष्ठसंख्यायुताः स्युः।

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अनुक्रमणिका

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मानव के उत्थान में श्रीमद्भगवद्गीता एवं कठोपनिषद् की भूमिका

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सारांश

वर्तमान समय में मनुष्य अनेक विकृतियों का सामना कर रहा है। कोविड जैसी महामारी ने उसकी कमर ही तोड़ दी है वह शारीरिक एवं मानसिक रूप से अनेक विकृतियों से ग्रस्त हो गया है, साथ ही उसे आर्थिक हालात का भी सामना करना पड़ रहा है। जिससे अनेक शारीरिक व मानसिक बीमारियों का जन्म हो रहा है। जैसे तनाव, चिंता, अवसाद, भय, आत्मविश्वास में कमी, शारीरिक क्षमता में कमी, नकारात्मक विचार, उदासी इत्यादि। भारतीय संस्कृति का अध्ययन करने पर हम पाते हैं कि वेदों, उपनिषदों एवं श्रीमद्भगवद्गीता में इन विकृतियों का बड़े ही सरल एवं वैज्ञानिक ढ़ग से योग द्वारा समाधान बताया गया है। कठोपनिषद् एवं श्रीमद्भगवद्गीता मनोवैज्ञानिक सिद्वान्तों एवं आध्यात्मिक जीवन जीने की कला का एक व्यावहारिक ग्रंथ है, वर्तमान परिस्थितियों में उत्पन्न विकृतियों के समाधन में कठोपनिषद् एवं श्रीमद्भगवद्गीता का ज्ञान उनका उचित मार्गदर्शन कर सकता है।

इन ग्रंथों में वर्णित श्रेष्ठ आत्म ज्ञान, निष्काम कर्म, योग साधना व भक्ति मनुष्य को वर्तमान परिस्थितियों में आत्मविश्वास बढ़ाने एवं शांतिपूर्ण जीवन जीने की शिक्षा देते है। कठोपनिषद् एवं श्रीमद्भगवद्गीता का अतुल्य ज्ञान मनुष्य को वर्तमान परिस्थितियों से निकालकर प्रगति की ओर उन्नयन करता है। मनुष्य के जीवन के समस्त दुःखों और इच्छाओं का समाधान, इन यौगिक ग्रन्थों में निहित है, यदि मनुष्य अपनी दिनचर्या से थोड़ा समय निकालकर इनमें वर्णित योग साधनात्मक तत्वों का अभ्यास करे, स्वाध्याय एवं श्रवण करे, उन्हें अपने जीवन में आत्मसात करें, तो वह वर्तमान परिस्थितियों में उत्पन्न विकृतियों के कुप्रभाव से बच सकता है और एक खुशहाल एवं शांतिमय जीवन जी सकता है।

मुख्य शब्द : श्रीमद्भगवद्गीता, कठोपनिषद्, योग, निष्काम कर्म, आत्मतत्त्व का स्वरूप।

प्रस्तावना

आज की प्रतिस्पर्धात्मक दौड़ में मानव एक विषम स्थिति में पहुँच गया है। कोरोना महामारी आज एक विश्व व्यापी समस्या का रूप ले चुकी है। सम्पूर्ण मानव जाति के लिए एक चुनौती बन गयी है।[1] कोरोना से प्रभावित देशों में 20 प्रतिशत मानसिक रोगी बढ़े है। आइ. सी. एम. आर. (भारतीय आयुर्विज्ञान अनुसंधान परिषद) के मुताबिक हर पांच में से एक भारतीय

[1] वैदिक वाग् ज्योतिः वर्ष 2020 अंक 14 vol. 8, पेज संख्या 45

Anvesak

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A STUDY OF RELATIONSHIP BETWEEN GENDER AND TYPE OF DISABILITY WITH YOGA ATTITUDE AMONGST PARA YOGASANA ATHLETES

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Abstract

Yoga attitude encompasses the various psychological perceptions people hold regarding yoga. In case of competitive para yogasana athletes, it not only relates the benefits of yoga to the holistic well-being of the body, mind, and spirit but also Yoga, with its methods for cultivating a dynamic body, enriching the mind, and elevating the spirit, serving as the focal point of interest besides taking the loss and defeat in the right spirit often referred to as the "sportspersonship". In light of this, the present study aimed to explore the attitudes of male and female para yogasana athletes and relationship between gender and type of disability with yoga attitude. The sample comprised young athletes in the age group of 13 to 21 years (N=105) with at least one year of experience from across various states of India.

Data collection occurred through online and offline modes using a random sampling technique. The Yoga Attitude Scale (YAS–M), developed by Mahesh Kumar Muchhal (2009), facilitated data collection. Statistical analysis involved measures such as mean, standard deviation, frequency distribution, percentage, and cross-tabulation using Pearson's chi-square using IBM SPSS package 25 version. Researcher developed and standardized the Yoga Attitude Scale and applied for the purpose of data collection. This is a three-point Likert type scale consisting of 30 items after testing the validity. The scoring pattern of the scale has positive items scoring (2, 1, 0) for all odd numbered statements and negative scoring for all the even numbered statements (reverse scoring). Computed value of reliability in terms of Cronbach's Alpha was found to be 0.751.

The study results highlight no significant gender impact on attitudes toward yoga. Further no significant relationship was found between yoga attitude and type of disability amongst the four categories: Blinds - under 20 years of age, deaf - under 20 years of age, orthopedically handicapped-Category-A - under 20 years of age and orthopedically handicapped-Category-B, under 20 years of age

Keywords: Attitude towards Yoga, Gender, Para-Yogasana Athletes

Introduction:

Yoga is like a panacea in the environment that is consistently fighting for survival and proneness of the human beings for more and more physical and psychological stress. Since we cannot always control the external factors but we can learn how to face and respond to them effectively. Yoga is not just a matter of