

EFFECT OF CHANDRA NADI PRANAYAMA (LEFT UNILATERAL FORCED NOSTRIL BREATHING) ON ECHOCARDIOGRAPHIC VARIABLES

Baljinder Singh Bal¹, Maman Paul², Davinder Singh³, Simran Kaur Bal⁴, Dilraj Singh Bal⁵

¹ Department of Physical Education (T), Guru Nanak Dev University, Amritsar, Punjab, India

² Department of Physiotrapy, Guru Nanak Dev University, Amritsar, Punjab, India

³ Department of Physical Education & Sports, KMV College, Jalandhar, Punjab, India

⁴ Department of Physical Education (T), Guru Nanak Dev University, Amritsar, Punjab, India

⁵ Department of Physical Education (T), Guru Nanak Dev University, Amritsar, Punjab, India

Abstract

Background: There is growing conviction that the disease has its origins in childhood and epidemiological evidence reveals that many young people exhibit at least one Cardiovascular disease (CVD) risk factor. Established risk factors for CVD include, obesity, physical inactivity, hypertension and hypercholesterolemia. **Aim:** The aim was to determine the effect of three weeks chandra nadi pranayama interventions on Echocardiographic variables. **Methodology:** Thirty female participants of Department of Physical Education (T), Guru Nanak Dev University, Amritsar between the age group of 21 - 29 years (Mean \pm SD: age 22.8 ± 2.023 yrs, height 5.53 ± 1.822 ft, body mass 61.506 ± 4.514 kg) were selected. **Statistical analysis:** "Paired-samples *t*-test" was used to compare the means of the pre-test and the post-test. The level of significance was set at 0.05. **Results:** The data does suggest that the difference between pre-test and post-test of female participants of Aortic Root Diameter, LA Dimension, LVD (Systolic), LCD (Diastolic), IVST, LVPWT, Sectional Shortening, EF Slope, DE Amplitude, Cusp Opening, AIV and PV is insignificant. Whereas the data does suggest that the difference between pre-test and post-test of female participants of RVD (Diastolic), Ejection Fraction, MV and TV is significant..

Keywords: chandra nadi pranayama, echocardiography, cardiovascular disease (CVD).

Introduction

There are four kinds of Yoga, and they are : Raja-Yoga, Jnana-Yoga, Bhakti-Yoga and Karma-Yoga. All these are the means to attain super conscious knowledge or God consciousness.^[1] Yoga's emphasis is on virtuous living, constant striving and moving according to an integrated approach to the desired end. This is the famous "Eight Limbs" known as Ashtanga yoga. The first five of these are external observances and the last three mental disciplines.^[2]

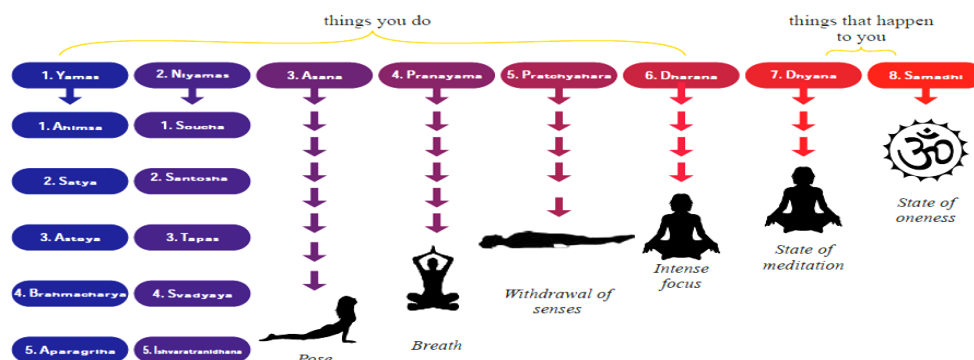


Figure-1: The eight limbs of yoga.

Nevertheless, when emotions are sudden and violent, whether they be positive (joy) or negative (sorrow), they may be detrimental for they create an inner upheaval which may be fatal. This provides that the mind is strong enough to influence the body in every possible way. This is why all ancient books on Yoga such as Yoga Shastra, Hatha-yoga Pradipika and Yoga-Sutra by Patanjali state that the "Yamas" (Mental discipline) and the "Niyamas" (Mental purification), should be practised first and only then followed by the "Asanas".^[3] Facts of consciousness are in the first instance classified as knowledge of realities (pramana), erroneous notions (viparyaya), ideas corresponding to expressions which do not denote realities but are helpful in their comprehensions (vikalpa), memory or replica of past experiences (smriti) and the dim awareness that accompanies dreamless sleep (nindra).^[4] The Yoga philosophy has essentially a practical tone and its object consists mainly in demonstrating the means of attaining salvation, oneness, the liberation of the purusha.^[5]

Pranayama is a Sanskrit word meaning "extension of the prana or breath" or "extension of the life force".^[6] Pranayama is control of the process of breathing. It is usually done in the position chosen for Yoga practice.^[7] Pranayama is the proper organizing and channelizing of breath. When breathing becomes balanced, harmonious and pure and inhalation equals exhalation it is Pranayama.^[8] Considering the physiology of Pranayama, Swami Niranjananda of Bihar School of Yoga has classified Pranayama as hyperventilation and hypoventilation.^[9] From the point of view of concentration and exercise, pranayama is classified as follows: Raja Yoga pranayama and Hatha Yoga pranayama. The Raja Yoga pranayama is carried out by will power only. The fingers are not used for these breathing exercises. In Hatha Yoga pranayama the fingers of the right hand are divided into three groups. The right thumb is placed on the right nostril, the ring finger and little finger are placed on the left nostril, and the index and middle fingers are folded into the palm.^[10]

Pranayama is an ideal method for producing calmness and tranquillity.^[11] The techniques of pranayama provide the method where by the flow of prana, in the nadis is regulated, activated and purified giving physical and mental stability.^[12] In Pranayama one is aware that the act of breathing has four distinct stages.^[13] The four stages are:-

1. Inhalation or Puraka.
2. A pause in breathing, called Kumbhaka.
3. Exhalation, or Rechaka.
4. A pause in breathing again, this time on empty lungs.

Rationale of the study

Cardiovascular disease (CVD) continues to be a major cause of morbidity and premature mortality in western society. There is growing conviction that the disease has its origins in childhood^[14] and epidemiological evidence reveals that many young people exhibit at least one CVD risk factor.^[15, 16]

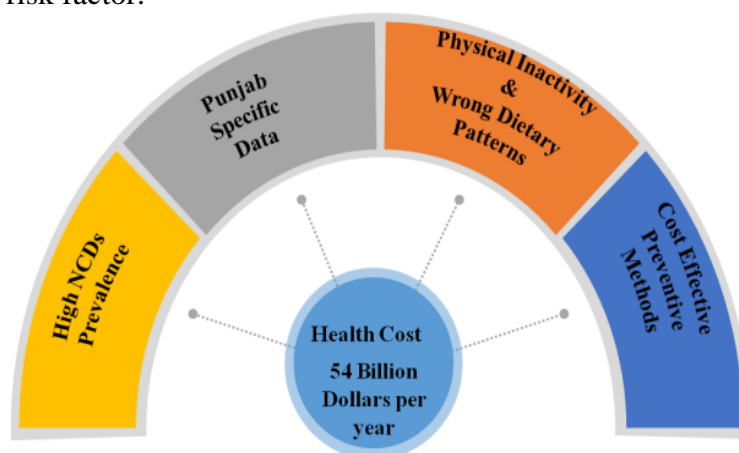


Figure-2: Rationale of the study.

Cardiovascular diseases contributed to 28.1% (95% UI 26.5-29.1) of total deaths and 14.1% (12.9-15.3) of total DALYs in India in 2016 compared with 15.2% (13.7-16.2) and 6.9% (6.3-7.4), respectively, in 1990.^[17] The prevalence of rheumatic heart disease in 2016 was similar across the ETL state groups, with the highest prevalence in several states spread across the country (**Figure-3**).

Situation in India

- NCDs are estimated to account for 63% of all deaths.

Punjab

- Highest prevalence of NCDs risk factors in India specifically CVD, Diabetes, Cancer & Lung conditions.

Major Culprits

- Physical inactivity - 4th leading factor for global mortality.

Need of Cost Effective Methods for Prevention

- Exercise interventions as preventive & control measure of NCDs risk factors.

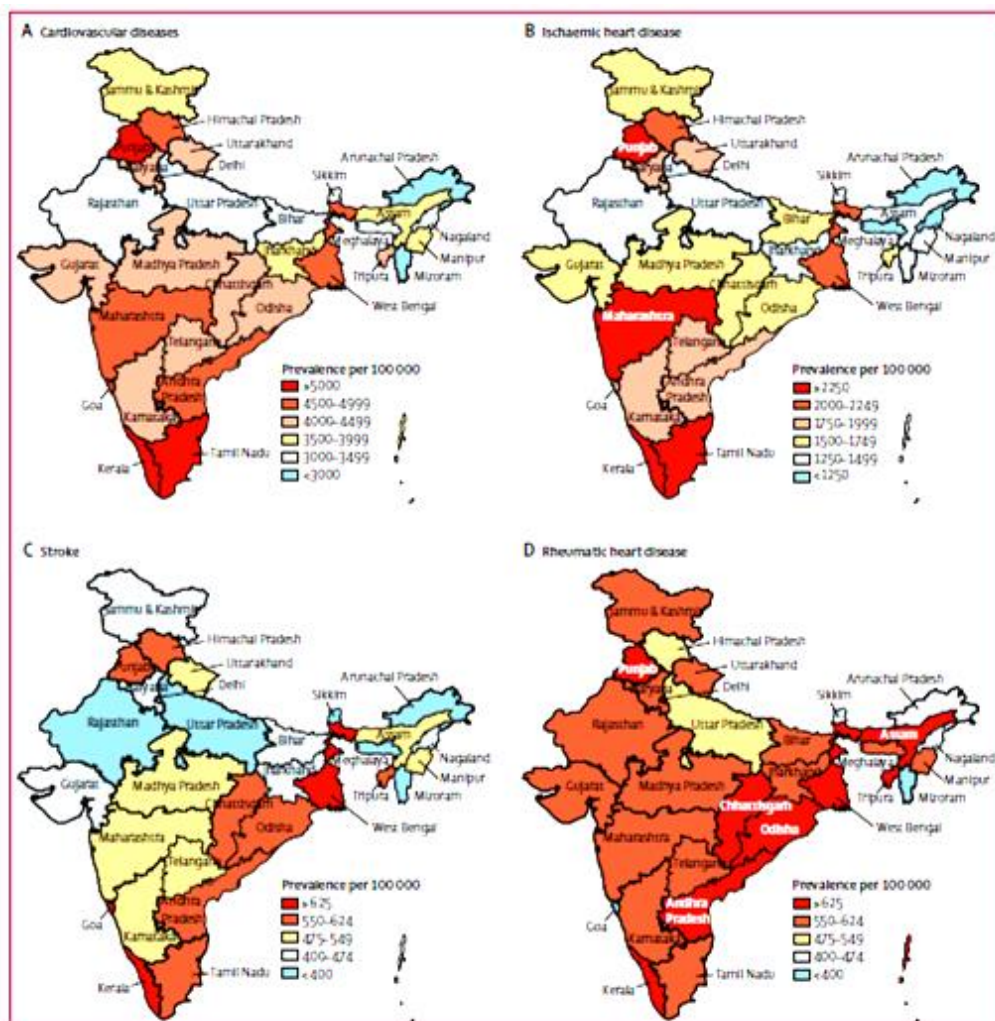


Figure-3: Crude prevalence of cardiovascular diseases and major component causes in the states of India, 2016.

Methodology

Subjects

Thirty female participants of Department of Physical Education (T), Guru Nanak Dev University, Amritsar between the age group of 21 - 29 years (Mean \pm SD: age 22.8 ± 2.023 yrs, height 5.53 ± 1.822 ft, body mass 61.506 ± 4.514 kg) were selected.

Design

The present study was a longitudinal (observational research method) follow-up study where the participants were selected using a convenience sampling technique i.e., participants were selected based on their availability to take part in the trial. Participants were assessed in two separate sessions pre-and post-interventions.

Assessments

Baseline data of each participant for the Echocardiographic variables were measured in the laboratory of Health Centre, Guru Nanak Dev University, Amritsar (Punjab). Participants were evaluated two times throughout the study-pre-and post-test time.

Intervention

Thirty female participants of Department of Physical Education (T), Guru Nanak Dev University, Amritsar underwent interventions (chandra nadi pranayama) for 3-weeks; repeat assessments were performed on experimental group. There were no dropouts in the study. The details of chandra nadi pranayama interventions are provided in (Table-1).

Table-1: Three weeks chandra nadi pranayama interventions.

3-Weeks Chandra Nadi Pranayama Interventions			
Weeks	Schedule	Time	Duration
1 st Week	Preliminary Yogic Exercises	5 Minute	20 Minute
	Practice of Chandra Nadi Pranayama (9 Rounds X 1 Set)	10 Minute	
	Relaxation Posture	5 Minute	
2 nd Week	Preliminary Yogic Exercises	5 Minute	25 Minute
	Practice of Chandra Nadi Pranayama (9 Rounds X 2 Set)	15 Minute	
	Relaxation Posture	5 Minute	
3 rd Week	Preliminary Yogic Exercises	5 Minute	30 Minute
	Practice of Chandra Nadi Pranayama (9 Rounds X 3 Set)	20 Minute	
	Relaxation Posture	5 Minute	

Statistical analysis

The statistical analysis was performed using SPSS for Windows (Version 13.0, SPSS Inc, Chicago, IL). "Paired-samples *t*-test" was used to compare the means of the pre-test and the post-test. The level of significance was set at 0.05.

Results

The demographic and clinical characteristics of the Echocardiographic variables are presented in (Table-2).

Table-2: Descriptive statistics (Mean & Standard Deviation) and paired sample t-test of Echocardiographic variables i.e., Aortic Root Diameter, LA Dimension, LVD (Systolic), LCD (Diastolic), RVD (Diastolic), IVST, LVPWT, Sectional Shortening, Ejection Fraction, EF Slope, DE Amplitude, Cusp Opening, MV, AIV, TV, PV of female participants of Guru Nanak Dev University.

Aortic Root Diameter						
Group	Number	Mean	Standard Deviation	Standard Error of the Mean	t-value	p-value
Experiment (Pre-test)	15	2.74	0.33	0.08	1.87	0.08
Experimental (Post-test)	15	2.72	0.32	0.08		
LA Dimension						
Experiment (Pre-test)	15	2.65	0.28	0.07	1.46	0.16
Experimental (Post-test)	15	2.66	0.26	0.06		
LVD (Systolic)						
Experiment (Pre-test)	15	3.15	0.11	0.03	0.00	0.99
Experimental (Post-test)	15	3.15	0.13	0.03		
LCD (Diastolic)						
Experiment (Pre-test)	15	4.06	0.16	0.04	0.26	0.79
Experimental (Post-test)	15	4.06	0.19	0.05		
RVD (Diastolic)						
Experiment (Pre-test)	15	2.86	0.06	0.01	2.64	0.01*
Experimental (Post-test)	15	2.83	0.06	0.01		
IVST						
Experiment (Pre-test)	15	0.85	0.05	0.01	0.00	0.99
Experimental (Post-test)	15	0.85	0.05	0.01		
LVPWT						
Experiment (Pre-test)	15	0.82	0.05	0.01	0.00	0.99
Experimental (Post-test)	15	0.82	0.04	0.01		
Sectional Shortening						
Experiment (Pre-test)	15	0.64	0.05	0.01	1.73	0.10
Experimental (Post-test)	15	0.66	0.04	0.01		
Ejection Fraction						
Experiment (Pre-test)	15	61.73	1.67	0.43	3.21	0.00*
Experimental (Post-test)	15	62.47	1.41	0.36		
EF Slope						
Experiment (Pre-test)	15	81.60	3.38	0.87	1.71	0.10
Experimental (Post-test)	15	82.87	3.46	0.89		
DE Amplitude						
Experiment (Pre-test)	15	1.38	2.10	0.54	1.01	0.32
Experimental (Post-test)	15	0.83	0.06	0.01		
Cusp Opening						
Experiment (Pre-test)	15	1.86	0.07	0.01	0.56	0.58
Experimental (Post-test)	15	1.87	0.05	0.01		
MV						
Experiment (Pre-test)	15	109.87	4.32	1.12	7.40	0.00*
Experimental (Post-test)	15	112.80	4.43	1.14		
AIV						
Experiment (Pre-test)	15	94.93	2.60	0.67	0.42	0.68
Experimental (Post-test)	15	94.47	2.61	0.67		
TV						

Experiment (Pre-test)	15	43.73	5.42	1.40	2.59	0.02*
Experimental (Post-test)	15	45.80	5.44	1.40		
PV						
Experiment (Pre-test)	15	69.07	3.26	0.84	0.30	0.76
Experimental (Post-test)	15	69.33	3.72	0.96		

The data does suggest that the difference between pre-test and post-test of female participants of Aortic Root Diameter, LA Dimension, LVD (Systolic), LCD (Diastolic), IVST, LVPWT, Sectional Shortening, EF Slope, DE Amplitude, Cusp Opening, AIV and PV is insignificant. Whereas the data does suggest that the difference between pre-test and post-test of female participants of RVD (Diastolic), Ejection Fraction, MV and TV is significant.

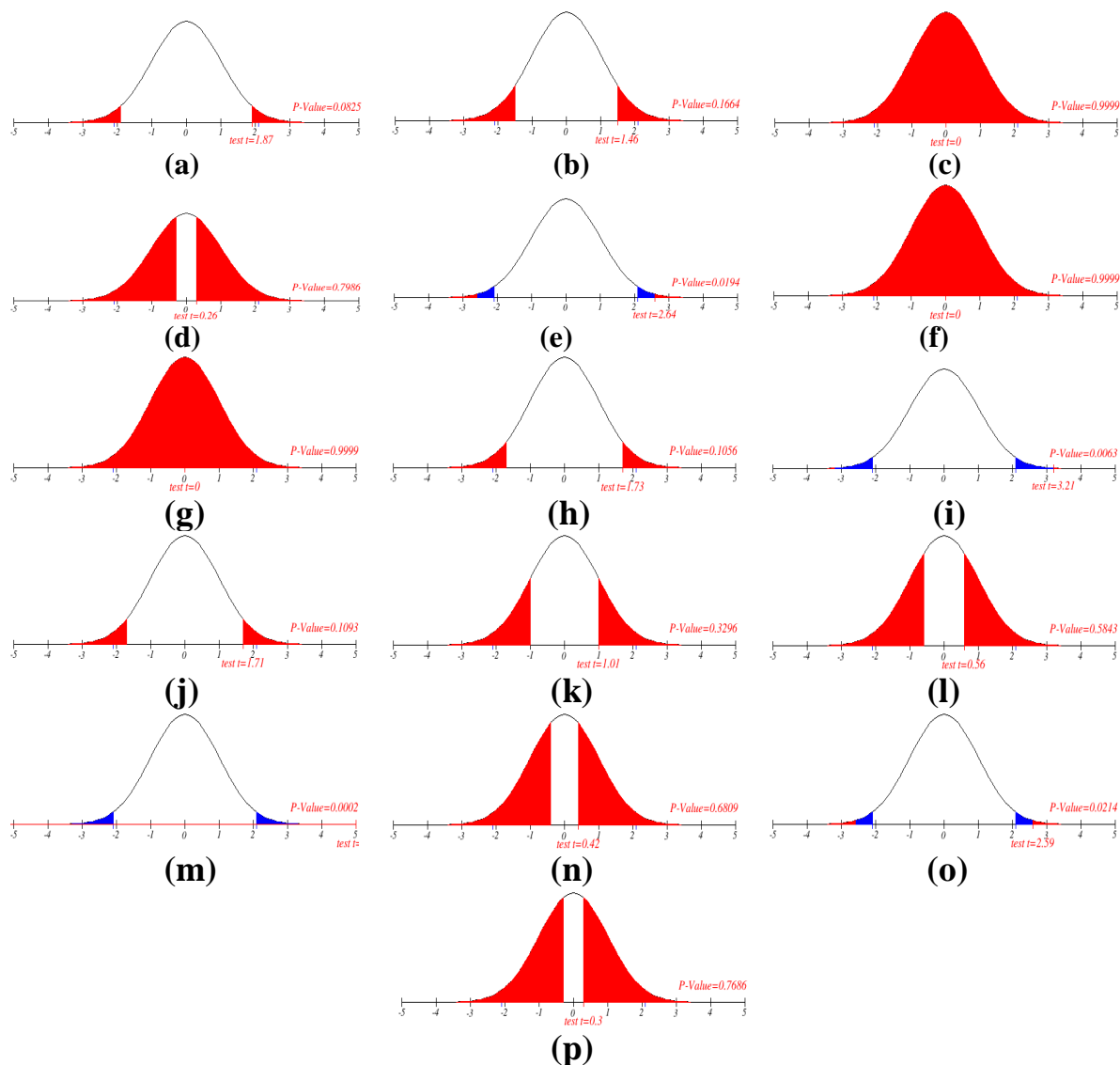


Figure-4: t-test and p-value of Echocardiographic variables i.e., (a) Aortic Root Diameter, (b) LA Dimension, (c) LVD (Systolic), (d) LCD (Diastolic), (e) RVD (Diastolic), (f) IVST, (h) LVPWT, (h) Sectional Shortening, (i) Ejection Fraction, (j) EF Slope, (k) DE Amplitude, (l) Cusp Opening, (m) MV, (n) AIV, (o) TV, (p) PV of female participants of Guru Nanak Dev University.

Conclusion

In summary, the present work manifests an overriding endeavour to determine the effect of three weeks chandra nadi pranayama interventions on Echocardiographic variables. No significant differences were found in Aortic Root Diameter, LA Dimension, LVD (Systolic), LCD (Diastolic), IVST, LVPWT, Sectional Shortening, EF Slope, DE Amplitude, Cusp Opening, AIV and PV whereas significant differences were found in RVD (Diastolic), Ejection Fraction, MV and TV.

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Correspondence Address:

Dr. Baljinder Singh Bal

Assistant Professor

Department of Physical Education (T)

Guru Nanak Dev University, Amritsar-143 005, Punjab, India

E-Mail: bal_baljindersingh@yahoo.co.in

Contact: + 91-7347384963