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Research Article

STUDY OF EFFECT OF SHORT TERM TRAINING OF ANULOM-VILOM PRANAYAM ON BLOOD CELL PARAMETERS IN MEDICAL STUDENTS

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ABSTRACT

Pranayama is the effective way for bringing the involuntary functions of the respiratory mechanism within human control. This technique is an important component of yoga. Anulom-Vilom Pranayam is also referred to as Nadi Suddhi pranayama. According to ancient Yoga literature, 'Nadi' refers to a channel through which flows the life force or energy within a body. A literal translation of the term Nadi Suddhi means, 'the purification of the invisible energy channels.' Practice of pranayama has been known to modulate cardiac autonomic status with an improvement in cardio-respiratory functions. Improvement in functions of cardio-respiratory system might change the status of Blood Cell parameters. Keeping this in view, the present study is designed to determine whether Anulom-Vilom Pranayam for 15 minutes followed by Shawasan has effect on Blood Cell Parameters. Thirty normal healthy subjects aged between 17-20 years, volunteered for this study. They were divided in to two groups. Group A subjects were observed for the procedure and Group B subjects were asked to sit in Sukhasan position for same duration with closing their eyes for meditation. All the selected physiological parameters were measured before and after performing 'Anulom – Vilom Pranayama' followed by Shawasan for four weeks. Experimental group showed significant increase in Hemoglobin ($p = 0.039$) and MCHC ($p = 0.041$) when compared with 't' paired test. Our study indicates that, Short term training of 'Anulom- Vilom Pranayam' shows significant effect on Hemoglobin & Mean Cell Hemoglobin Concentration.

Keywords: Anulom-Vilom Pranayam, Nadi Suddhi, Shawasan, Complete Blood Count, Blood Cell Parameters, Hemoglobin Concentration.

INTRODUCTION

Pranayama is powerful breathing technique that ensures healthy body and calm mind. It is traditionally viewed as a practice involving a lot more than just breathing for relaxation. It is a term having a broad range of meanings Regular practice of various types of pranayama improves breathing pattern and gives physical strength. So in this modern era, to achieve preventive, curative and rehabilitative aspects of health, Yoga is becoming most popular science. The Pranayam is an integral part of Yoga, which produces constituent physiological changes and has sound scientific basis. Anulom-Vilom Pranayam is a technique to change or control the normal breathing process to make Purak (inhalation), Kumbhak (retention) & Rechak (exhalation) deep & prolong. The word Pranayam is formed by Prana (energy) & Ayam (to expand or control). So it is a technique to control or expand the energy in body¹. Anulom-Vilom Pranayam is also referred to as Nadi Suddhi pranayama. Yoga writings use a variety of

terms for this, including nadi shodhanam, nadi suddhi and sukha purvaka. It is also called as Alternate nostril breathing. Anulom – Vilom is so named because, initially inspiration and expiration is done with one direction and again with opposite direction. Actually it is a combination of Suryabhedan & Chandrabhedan Pranayam, because when the inspiration is done by left nostril and expiration by right, it is called Chandrabhedan and if it is done in opposite way then called Suryabhedan². The technique of Anulom Vilom Pranayam used, which is mentioned in Gherand Samhita as Samanu (concentration of mind on specific point)³.

Practice of pranayama has been known to modulate cardiac autonomic status with an improvement in cardio-respiratory functions⁴. Improvement in functions of cardio-respiratory system might change the status of Blood Cell parameters. Keeping this in view, the present study is designed to determine whether Anulom- Vilom Pranayam for 15 minutes followed by Shawasan has effect on Blood Cell Parameters.

OBJECTIVES OF STUDY

The objectives of the present study were
To study the changes in CBC (Complete Blood Count) after performing regular practice of Anulom- Vilom Pranayam.

MATERIALS AND METHODS

Selection of subjects: One orientation session Conducted in class room of I BAMS of MG Ayurved College, DMIMS Deemed University. The 30 medical students, who volunteered themselves, were selected for the study. None of the subjects had been engaged in yoga practice in the past nor were they doing any physical exercise prior to this study period. Detail history was taken to rule out any personal health problems and their chronic diseases.

Exclusion Criteria

Subjects were excluded if they had a medical disease, they currently suffering from any infections, allergies or inflammatory responses and they had ever been taking major psychotropic medications, smokers or alcoholics.

The protocol for this study was approved by the institutional Ethics committee. The details of the study explained to the subjects, their signed informed consent was taken & they were assessed, using a questionnaire before the onset of the study regarding their awareness about yoga.

Study Design: The study included 30 students and was randomized into two groups.

Group A (N =15) – Experimental Group – This Group was given the training, which included Omkar in Padmasan / Sukhasan- 5 minutes. Anulom-Vilom Pranayam (Alternate Nostril breathing exercise)- 15 minutes. Shavasan - 5 minutes.

Group B (N =15) – Control Group – At the same time this group was asked to sit in Sukhasan position for same duration with closing their eyes for meditation.

This lasted for 4 weeks with consistent daily 25 min session and was conducted for continuous six days in a week with

Sunday as a relaxing day. Subjects served as their own control. Data on physical characteristics was obtained such as age, height & weight.

PARAMETERS STUDIED

- Weight
- Height
- Red Blood Cells (RBCs)
- Hemoglobin (Hb %)
- Hemoglobin Concentration (HCT)
- Mean Cell Volume (MCV)
- Mean Cell Hemoglobin (MCH)
- Mean Cell Hemoglobin Concentration (MCHC)

Methodology

All parameters were recorded prior to start of training & at the end of 4 weeks course. The students were called to tares of college building for Yoga training at 8 am sharp every day.

Weight - It is measured in Kilograms by electronic weighing machine.

Height – It is recorded in centimeters.

CBC (Complete Blood Count) – All these parameters are measured by cell counter.

At the end of 4 weeks course, reactions of all subjects were also assessed by a questionnaire.

Descriptive and comparative analyses were performed using the Statistical test. Parametric data were expressed as means ± SD. The paired ‘t’ test was used to compare these parameters before and after Pranayam course separately between control subjects and experimental group. Probability value of <0.05 was considered statistically significant.

OBSERVATIONS AND RESULTS

Anthropometric parameters are summarized in table 2 showing mean age of 18 years height 163 cms & weight 46.2 kilograms when both males & females are compared.

Table 1: Shows numbers of males & females participating in each study group.

Sex	Male	Female	Total
Group A	04(26.66 %)	11(73.33 %)	15(100 %)
Group B	04(26.66 %)	11(73.33 %)	15(100 %)
Total	08(26.66 %)	22(73.33 %)	30(100 %)

Table 2: Anthropometric distribution of the study subjects

Sex		Age	Height	Weight
Female	N =22			
	Mean	18.25	156.4167	44.2500
	Std. Deviation	0.7538	6.5912	2.9571
	Std. Error of mean	0.2176	1.8848	2.9571
Male	N =08			
	Mean	18.50	168.60	50.76
	Std. Deviation	1.1671	7.2140	12.2042
	Std. Error of mean	0.2132	1.3171	2.2282
Total	N =30			
	Mean	18.428	163.1190	46.2013
	Std. Deviation	1.0625	6.9030	12.8946
	Std. Error of mean	0.1639	1.3739	1.9896
	Minimum	17.00	145.00	39.00
	Maximum	22.00	184.00	61.00

Table 3: Comparison of RBCs, Hb%, HCT, MCV, MCH and MCHC in experimental group at pre and post test

Variables		Mean	N	Std. Deviation	Std. Error Mean
RBCs	Pre Test	4.76	15	0.50	0.13
	Post Test	4.53	15	0.60	0.15
Hb%	Pre Test	12.90	15	2.05	0.52
	Post Test	12.27	15	1.88	0.48
HCT	Pre Test	39.33	15	5.70	1.47
	Post Test	39.08	15	5.53	1.42
MCV	Pre Test	83.06	15	9.70	2.50
	Post Test	87.33	15	10.44	2.69
MCH	Pre Test	28.13	15	5.14	1.32
	Post Test	28.17	15	6.75	1.74
MCHC	Pre Test	32.97	15	1.01	0.26
	Post Test	30.40	15	2.69	0.69

Table 3 (a) Paired sample test in experimental group

	Paired Differences					t	df	p-value
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
RBCs	0.23	0.34	0.08	0.04	0.42	2.597	14	0.021,S,p<0.05
Hb%	0.63	0.83	0.21	0.17	1.09	2.933	14	0.011,S,p<0.05
HCT	0.25	2.70	0.69	-1.24	1.74	0.363	14	0.722,NS,p>0.05
MCV	-4.26	4.11	1.06	-6.54	-1.98	4.017	14	0.001,S,p<0.05
MCH	-0.04	2.14	0.55	-1.22	1.14	0.072	14	0.943,NS,p>0.05
MCHC	2.57	2.22	0.57	1.33	3.80	4.473	14	0.001,S,p<0.05

Table 3 & 3(a) compares the pre & post values of parameters (RBCs, Hb%, HCT, MCV and MCHC) in experimental group. We find that the changes in post mean values of RBCs , HCT , MCV & MCHC are statistically very significant.

Table 4: Comparison of RBCs, Hb%, HCT, MCV, MCH and MCHC in Control group at pre and post test

Variables		Mean	N	Std. Deviation	Std. Error Mean
RBCs	Pre Test	4.56	15	0.50	0.12
	Post Test	4.62	15	0.47	0.12
Hb%	Pre Test	12.30	15	1.62	0.42
	Post Test	13.32	15	1.91	0.49
HCT	Pre Test	36.93	15	4.64	1.19
	Post Test	38.30	15	4.63	1.19
MCV	Pre Test	83.33	15	11.47	2.96
	Post Test	83.73	15	8.90	2.29
MCH	Pre Test	27.24	15	3.93	1.01
	Post Test	27.19	15	5.06	1.30
MCHC	Pre Test	32.68	15	0.79	0.20
	Post Test	32.28	15	2.07	0.53

Table 4(a) Paired sample test in control group

	Paired Differences					t	df	p-value
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
RBCs	-0.06	0.25	0.06	-0.20	0.07	1.008	14	0.331,NS,p>0.05
Hb%	-0.02	0.53	0.13	-0.31	0.27	0.146	14	0.886,NS,p>0.05
HCT	-1.37	1.81	0.46	-2.37	-0.36	2.923	14	0.011,S,p<0.05
MCV	-0.40	4.77	1.23	-3.04	2.24	0.324	14	0.751,NS,p>0.05
MCH	0.04	1.65	0.42	-0.86	0.96	0.109	14	0.915,NS,p>0.05
MCHC	0.40	1.90	0.49	-0.65	1.46	0.825	14	0.423,NS,p>0.05

Table 4 & 4 (a) compares the pre & post values of parameters (RBCs, Hb%, HCT, MCV and MCHC) in control group.

Table 5: Comparison of RBCs, Hb%, HCT, MCV, MCH and MCHC in Both group at post test

Variables	Group	N	Mean	Std. Deviation	Std. Error Mean
RBCs	Experimental	15	4.62	0.47	0.12
	Comparison	15	4.53	0.60	0.15
Hb	Experimental	15	12.32	1.91	0.49
	Comparison	15	12.27	1.88	0.48
HCT	Experimental	15	38.30	4.63	1.19
	Comparison	15	39.08	5.53	1.42
MCV	Experimental	15	83.73	8.90	2.29
	Comparison	15	87.33	10.44	2.69
MCH	Experimental	15	27.19	5.06	1.30
	Comparison	15	28.17	6.75	1.74
MCHC	Experimental	15	32.28	2.07	0.53
	Comparison	15	30.40	2.69	0.69

Table 5 (a) Paired sample test in both groups

	t	df	p-value	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
RBCs	0.452	28	0.655 NS, p>0.05	0.09	0.19	-0.31	0.49
Hb	2.077	28	0.039* S, p>0.05	0.05	0.69	-1.36	1.47
HCT	0.417	28	0.680 NS, p>0.05	-0.77	1.86	-4.59	3.04
MCV	1.016	28	0.318 NS, p>0.05	-3.60	3.54	-10.85	3.65
MCH	0.449	28	0.657 NS, p>0.05	-0.98	2.18	-5.44	3.48
MCHC	2.142	28	0.041 S, p<0.05	1.88	0.87	0.08	3.67

Table 5 & 5 (a) shows that experimental group showed significant increase in Hemoglobin (p – 0.039) and MCHC (p – 0.041) when compared with ‘t’ paired test.

DISCUSSION

Yoga is considered to be one of the most important effective and valuable ancient Indian systems to overcome various physical and psychological problems. Studies on Yoga claim prolonged existence^{5,6}.

Anulom – Vilom Pranayam is of control the normal breathing process to make Purak (inhalation), Kumbhak (retention) & Rechak (exhalation) deep & prolong. In Kumbhak stage volunteered holding of breath, body try to sustained in increased CO₂ level which is one factor to stimulate heart rate during exercise⁷. The practice of Anulom – Vilom Pranayam results in deep & prolonged breathing⁸ which increases the oxygen carrying capacity of blood by improving hemoglobin concentration. As pure oxygenated air is breathed into the lungs with each cycle, the blood gets purified and circulation improves. This pranayama helps strengthen the lungs and increases overall lung capacity.

This Anulom – Vilom Pranayam exercise involves physical, mental and spiritual task in a comprehensive manner. It brings about behavioral changes. Yoga in long duration affects hypothalamus and brings about decrease in systolic and diastolic blood pressure through it's influence on vasomotor centre, which leads to reduction in sympathetic tone and peripheral resistance^{9,10}.

CONCLUSION

Short term training of Anulom- Vilom Pranayam show significant effect on Hemoglobin & Mean Cell Hemoglobin

concentration. This effect can be analyzed in large sample size positively.

The positive results found in the present study might improve work efficiency. A few minutes practice daily may help in improving working stamina to better on works. The daily practice could also be part of physical fitness and life style modification programs in maintaining better physical and mental health. Although the present study with larger number of subjects from different lifestyles need to establish the beneficial effects of Anulom- Vilom pranayama practice.

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REFERENCES

1. Sarvesh Kumar Agrawal : Pranayam – The modulator of Life I edition , Chaukhambha Orientalia, 5: 37-42.
2. Gherand Samhita: Dr. Chamanlal Gautam, Sanskriti Sansthan, Bareilly reprint edition, 2003.
3. Hatha Yog Pradipika , Swami Muktibodhananda, Publication Trust, Yoga, Munger, Bihar, First edition, 1985; 2: 7-13.
4. Khanam A.A., Sachadeva U Guleria R Deepak K K: Study of pulmonary and autonomic functions of asthma patients after yoga training. Indian J of Physioal Pharmacol., 1996; 40: 318-324.

5. Pathak JD, Mehrotra PP, Joshi SD. A plea for 'Pranayam' for elderly. Indian J Physiol Pharmacol 1978; 22(Suppl 4):77-80.
6. Tiwari OP. Yoga for keeping fit in old age. Swastha Hind 1983;24:144-58
7. Bhargava R. Gogate MG, Mascarenhas JF. : Autonomic response to breath holding and it's variations following pranayam. Indian J of Physioal Pharmacol., 1988; 32: 257-264.
8. Joseph S. Sudharan K et al: study of some physiological & biochemical parameters in subjects undergoing yogic training. Indian J. Med. Res. 74:120-124, 1981.
9. Khanam AA., Sachdeva V. et al: Study of Pulmonary and autonomic functions of asthama patients after yoga training. Indian J. Physical Pharmacol, 1996; 40 (1): 318-321.
10. Udupa KN Singh RH. Settiwar RM. Studies on the effect of some yogic breathing exercises (Pranayam) in normal persons.

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