



## EFFECT OF REGULAR YOGA PRACTICES ON HEMATOLOGICAL INDICES

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**ABSTRACT**

**Background:** -In the epoch of current civilization, the wallop of industrialization technology can be envisioned on every facet of human life. So consequently, he is unable to fixed surplus time even a smaller period of time to look after his health. Due to this situation he is more recumbent to all sorts of ailments due to lack of proper exercise, diet and rest. Longer duration and unscheduled working hours, unbalanced diet and less rest periods have turned him into a physically weaker, mentally unbalanced, emotionally debouched and socially antagonistic individual. Yoga practices hold great promise and potential in the field of medical science

**Aim :-**Yoga as therapy is still at the stage of clinical research this study is undertaken to find out the changes in various hematological parameters after yoga practice which may lead to a positive effect on human life.

**Materials and methods:-** Male students having similar dietary and lifestyle pattern were grouped into two groups experimental and control group having 35 students in each group.

The experimental group were given yoga training for six months while the control group was devoid of any such intervention. Pre and post haematological parameters were examined and were statistically compared between the groups for analysing significant changes in hematological changes.

**Result:-** At the end of the operational research statistically significant changes were noticed in the hematological parameters between the two groups.

**Discussion and conclusion:** At the end it can be concluded that regular yoga practice is helpful for the positive change in total erythrocytes, count total leucocytes counts ,haemoglobin and neutrophil counts in human blood. Increased leucocytes and neutrophil counts chiefly contribute in improving immunity system while increased TRBC and haemoglobin may contribute to proper oxygenation to tissue.

**KEYWORDS :** Yoga , TRBC, TWBC, Hemoglobin , Neutrophil**INTRODUCTION**

Holistic health, integrative treatment and mind, body medicine are some of the current buzz words in health care originated actually from yoga, which took its birth some 6000 years ago in India and is one of the elements of ayurvedic medicine as the healing science<sup>(1)</sup>.

Yoga practices are gaining popularity and have the potential to make a significant contribution to the field of health sciences. Having a wide array of practice, all essentially including breathing exercises, physical postures and meditation, the science, and art of yoga is reaching new heights. Associated with a series of behavioural modifications that contribute to a healthy lifestyle, traditional yoga is a philosophy for living<sup>(2)</sup>. Recently, scientists have explored its consistent beneficial biochemical, physiological, psychological effects in human beings. Yoga based training normalizes the functions of the autonomic nervous system by maintaining both sympathetic and parasympathetic indices toward normal<sup>(3)</sup>. It is found that yoga has an immediate effect on the HPA axis (hypothalamic-pituitary axis) response to stress<sup>(4)</sup>. Though precise mechanism has not yet been established. Its being hypothesized that some yoga exercises via vagus stimulation, lead to a shift toward parasympathetic nervous system predominance. A significant effect of yoga has been noticed in decreasing the blood glucose level, the heart rate, and systolic and diastolic blood pressure<sup>(5)</sup> Blood is a fluid connective tissue which consist of elements (erythrocytes/RBC, leucocytes/WBC, and platelets) in blood plasma. The cellular components of blood often more related to training and physiological changes. RBC (erythrocytes) plays omnipotent role as they transport oxygen & nutrients to hypoxic muscles while WBC (leukocytes) works as ambulance for the injured tissue while training & also called front line defences mechanism of body.

WBC (leukocytes) consist of neutrophil which helps to fight infection by ingesting microorganisms and releasing enzymes that kill the microorganisms clears the cellular debris for muscle growth and repair.

**AIM AND OBJECTIVE:**

Given the limited information available on the hematological and biochemical changes associated with the extended practice of yoga, studies on hematological and biochemical modulation in regular yoga practitioners need extensive research exposure to recommend the use of yoga as a complementary therapy in those cases where the above-mentioned parameters are altered. Hence this study was undertaken with the aim to investigate the change in certain haematological

parameters after regular practice of yoga.

**MATERIAL AND METHOD**

The study was carried out on male student of Govt. Medical College Raipur (CG). Study group was divided into two group experimental group who received yoga intervention and control group who were not given any such intervention. Each group comprise of 35 healthy male subjects between 18-21 years mean 19.3 ±0.87 . Hematological parameters studied were total red blood cell count (TRBC Count), total (White blood cell count) T.W.B.C Count, haemoglobin and neutrophil determined by automated hematology auto-analyzer (Sysmax). For this study, taking all aseptic precautions, 3 ml venous blood sample was drawn from the antecubital vein of each subject at first, before start yoga practice session before the beginning of the study; Second blood sample was taken after 6 month of yoga practice from the start of study.

Study group underwent yoga practices for 60 minutes once a day at early morning in the presence of a trained yoga teacher for 6 months. The study protocol was explained to the subjects and written consent was obtained from them. All the volunteers were clinically examined to rule out any systemic diseases. All subjects were non-alcoholic and non-smokers. They were not taking any drugs, and they had similar dietary habits as well as physical and mental activities at work and home. They were not practicing any known stress relieving or relaxation technique previously.

All the volunteers of study group were trained under the guidance of a certified yoga teacher for 6 months. They carried out Yogasanas and Pranayama for 60 minutes in the morning for 6 months. The schedule consisted of:

- Yogasanas-50 minutes.
- Pranayama-10 minutes.

**The asanas practiced were:**

Ardhachakrasana, Tadasana, Paschimottasana, Uthitha Trikonasana, Vajrasana, Salamba Sarvangasana and Halasana.

**The Pranayama performed was: Anulom-vilom**

The volunteers practiced these exercises early in the morning, in a quiet, well ventilated room or in open air space sitting in a comfortable posture.

At the end of the operational research blood samples were again taken from all the subjects from experimental and control group for necessary haematological analysis.

Necessary institutional ethical committee clearance was obtained for the study

#### STATISTICAL ANALYSIS:

The data was analyzed statistically by using statistical software SPSS

#### RESULTS

**Table 1: Tabulation of Mean median, SD (Pre and Post-test) of total RBC Total leucocytes count Hb and neutrophil count among subjects in experimental group .**

	Pre test n=35				Post test n=35			
	TRBC Count/c.mm	TWBC Count/c.mm	Hb gm/dl	Neutrophil Count/c.mm	TRBC Count/c.mm	TWBC Count/c.mm	Hb gm/dl	Neutrophil Count/c.mm
Mean	3.9	8592.1	11.5	4555.8	4.7	9013.5	12.3	5283
Median	4.0	8760	11.4	4389	4.7	8765	12.4	5123
SD±	0.28972	506.1	1.9	380.8	0.226	652.1	0.52	806.1

n=no of students

**Table 2: tabulation of Mean median , SD ( Pre and Post-test ) of total RBC Total leucocytes count Hb and neutrophil count among subjects in control group**

	Pre test n=35				Post test n=35			
	TRBC Count/c.mm	TWBC Count/c.mm	Hb gm/dl	Neutrophil Count/c.mm	TRBC Count/c.mm	TWBC Count/c.mm	Hb gm/dl	Neutrophil Count/c.mm
Mean	3.9	8564.4	11.3	4615.5	3.9	8485.6	11.3	4642
Median	4.0	8760	11.5	4567	4.0	8632	11.7	4570
SD±	0.2822	529.1	0.88	392.6	0.376	554.0	1.05	393.6

n=no of students

From Table 1, it can be observed that the values of all hematological parameters were significantly increased after six month of yoga practice as compared to basal readings of the male student in experimental group.

While from table 2, it can be observed that there were no significant changes in the values of all hematological parameters after six month of yoga practice as compared to basal readings of the male student in control group.

**Table 3: Mann-Whitney test output of hematological indices post intervention between experimental and control group**

hematological indices	Experimental group n=35			control group n=35			Mann-Whitney U value	Z value	P value
	Median	SD	Mean rank	Median	SD	Mean rank			
TRBC Count/c.mm	4.7	0.226	51.56	4.0	0.376	19.44	50.5	-6.6	0.000
TWBC Count/c.mm	8765	652.1	44.13	8632	554.0	26.87	310.5	-3.5	0.000
Hb gm/dl	12.4	0.52	46.11	11.7	1.05	24.89	241.0	-4.3	0.000
Neutrophil Count/c.mm	5123	806.1	47.1	4570	393.6	23.90	206.5	-4.7	0.000

n=no of students

From Table 3 it is observed that after six months when the hematological indices of both the groups were statistically compared there were statistically significant increased in TRBC TWBC haemoglobin and neutrophil count ( $p < 0.05$ ) in the students of experimental group than that of control group.

circulation the red blood corpuscles stored in spleen and accessory spleen. Asanas and exercise also increase the myoglobin pigment which is helpful to supply more amount of oxygen<sup>(8)</sup>.

#### DISCUSSION

On analyzing the effect of yoga on hematological parameters in normal healthy subjects of Govt. Medical College Raipur (CG), in our study, total RBC, total W.B.C and hemoglobin and neutrophil count it a statistically significant increased in experimental group student than that of control group after the post yoga session after six months. Our study results collaborates with studies of other researchers<sup>(6,7)</sup>.

Neutrophil count in present study is because of biochemical reaction in the body as the Neutrophil function as the first line of defence involving in process of phagocytosis. Present investigations also supports earlier findings by other researchers<sup>(9,10)</sup>.

Practice of Yogasana improves biochemical profile indicating anti-stress and antioxidant effect, important in production of degenerative disorders. Earlier studies have shown significant improvement in RBC with practice of Yogasana for about 4 weeks. Apparent increase in the concentration of red blood corpuscles is due to mobilization of plasma from blood to tissue fluid. Besides this, Yogic asanas, pranayama and exercise makes a greater amount of oxygen supply thus putting into circulation the red blood corpuscles stored in spleen and accessory spleen.

“When you exercise, elevations in the activity of your white blood cells may allow your body to identify disease-causing organisms more quickly than they would under normal circumstances<sup>(11)</sup>. During aerobic training the subject went under metabolic changes that contributed the white blood cell to adapt the continuous disturbed homeostasis through increasing immunity with the help of increasing total leucocytes counts and neutrophil. White blood cell work as an ambulance through which anti-inflammatory situations are tackled. Neutrophil releases cytokines which attract and activates anti-inflammatory enzymes and also releases O<sub>2</sub> free radicals. Neutrophil works as phagocytes which thereby clears the damaged surface and promote the various proteins for the growth and does improve immunity.

Documented scientific evidence strongly indicates that yoga has promotive, preventive as well as curative potential. As a non-pharmacological therapeutic and safe modality it can be used as an effective lifestyle adjunct to medical treatment to reduce drug dosage and improve quality of life of patients. It is to be emphasized that yoga is very effective for prevention as well as management of all pervading stress and stress related disorders. Modern medicine is very effective in controlling infections, performing surgeries and managing diseases.

#### CONCLUSION :

From the results of the present study it can be tentatively concluded that that regular yoga training program is helpful for the positive change in TRBC, Hb levels in blood providing maximum oxygen to the tissue and also increase in total leucocytes counts and neutrophil counts in human blood. Increased leucocytes and neutrophil counts chiefly contribute in improving immunity system.

Earlier studies have shown significant improvement in RBC with practice of Yogasana for about 12 weeks. Apparent increase in the concentration of red blood corpuscles is due to mobilization of plasma from blood to tissue fluid. Besides this, Yogic asanas, pranayama and exercise make a greater amount of oxygen supply thus putting into

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