

Psycho-Physiological Effects of Some Yogic Practices on the Selected Parameters of Human Subjects

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ABSTRACT

Introduction: Yoga is an ancient Indian mind body approach that has components centering on Asanas, Pranayamas, Shatkarmas, Meditation and Mudras with Bandhas. The present study explores the impact of Kapalbhathi and Bhrmri pranayama with Vaman therapy on college going students of J.S. Sanskrit Mahavidyalaya, Saptrishi Ashram, Haridwar. This study was aimed at examining the effect of selected yogic practices (Kapalbhathi and Bhrmri pranayama with Vaman therapy) on psycho-physiological parameters (Hemoglobin, Erythrocyte Sedimentation Rate, Forced Vital Capacity and Physical & Mental health parameters).

Material and methods: For this study 40 volunteers, with age ranging 18 to 25 years were randomly selected. The yoga training module was administered on experimental group for one hour in the morning. After two months all the psychological and physiological tests were measured in Brahmavarchas Research center, Haridwar.

Results: The statistical analysis showed the significant improvement on Hemoglobin, Erythrocyte Sedimentation Rate, Forced Vital Capacity, physical and mental health. Results showed statistically significant increase (12.2-13.10, observed t value = 5.61) in post hemoglobin level of participants and Forced vital capacity values before and after intervention were 65.05-88.02, observed t value = 14.63. Pre mean and post mean value of Erythrocyte sedimentation rate were 9.5- 3.45, observed t value = 5.85. Values for psychological parameter were 18.42- 12.2, observed t value = 9.14. All the values were statistically significant on 0.01 level.

Conclusion: The present study suggest that Kapalbhathi and Bhrmri pranayama with Vaman therapy can be used as a possible treatment for the management of psycho-physiological parameters.

Keywords: Erythrocyte Sedimentation Rate, Forced Vital Capacity, Hemoglobin, Vaman, Shatkarmas

Kapalbhathi is a pranayama technique which invigorates the entire brain and awakens the dormant centres which are responsible for subtle perception. Forced exhalation in Kapalbhathi increases the massaging effect on the brain by enhancing the decompression effect on every exhalation. Kapalbhathi also expels more carbon dioxide and other waste gases from the cells and lungs than normal breathing¹. Hence Kapalbhathi pranayama is used to energize the mind and has a cleansing effect on the lungs. According to Swami Niranjana Saraswati Bhrmri pranayama creates soothing effect on the mind and nervous system, relieving cerebral tension, stress, anxiety and insomnia and also eliminates throat ailments.² Vaman technique tone and stimulate all the abdominal organs by reducing excess mucus and helping to remedy cough and cold, bronchitis, asthma and other respiratory ailments.³

Material and Methods: 40 subjects studying in a J.S. Sanskrit Mahavidyalaya Haridwar in the age range of 18-25 years were selected for the study. After getting the permission of parents and/ or school teachers, students were selected by using random sampling. Subjects were recruited from 12th standard to post graduation. The duration of the study was 60 days during which the subjects undertook selected yogic intervention regularly for one hour under expert supervision. All the subjects took simple vegetarian diet and they were not allowed to participate in any usual spiritual activity. Subjects were screened based on the following inclusion and exclusion criteria.

Inclusion Criteria

1. Age group of 18-25 years.
2. Male students
3. Willingness towards participation

Exclusion Criteria:

1. Students who were below 18 and above 25 years.
2. Female students
3. Students who underwent major surgery

Research Design: One group pretest-posttest design was

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How to cite this article: Joshi BP. Psycho-physiological effects of some yogic practices on the selected parameters of human subjects. International Journal of Contemporary Medical Research 2020;7(11):K1-K3.

DOI: <http://dx.doi.org/10.21276/ijcmr.2020.7.11.30>



used for the study. Assessments were done at baseline (Day 1) and after 60 days of the respective intervention. The details of the yoga module are as follows;

1) Initial 20 days:

- Vaman** (once in week)
- Kapalbhati** (Relax for 2 minutes after each 20 strokes of breathing)
- Bhramri** (Performed for 8 times and relaxed.)

2) Medial 20 days:

- Vaman** (Twice in a week)
- Kapalbhati** (Relax for three minutes after each 25 strokes)
- Bhramri** (Performed for 16 times and relaxed)

3) Final 20 days:

- Vaman** (thrice in a week)
- Kapalbhati** (For 15 to 20 minutes)
- Bhramri** (For 20 to 25 minutes)

Tools

1. Hemometer
2. E.S.R. Tube (Western Method)
3. Spiro meter (Recorder and Medical Company, Chandigarh)
4. Psychological (Physical and mental health questionnaire by S.K. Verma, N.N. Wig, D. Prasad)

Statistical Analysis: Data were analyzed using descriptive as well as inferential statistics. The statistical analysis was done using data analysis tool of Microsoft Excel. The statistical significance was considered at 0.01 level. The responses of the pre and post tests were analyzed by using the statistical procedures of Mean, Standard deviation and t ratio as shown in table below.

RESULTS

Hemoglobin- It was found that the pre mean and post mean

value of the group was 12.2 and 13.10 respectively and the t value received is 5.61 which was significant at 0.01 level (table-1).

Erythrocyte sedimentation rate (ESR) - Thus it was found that the pre mean and post mean value of the group was 9.5 and 3.45 respectively and the t value received was 5.85, which is significant at 0.01 level (table-2).

Forced Vital capacity (FVC) - The pre mean and post mean value of the group was 65.05 and 88.02 respectively and the t value received was 14.63 which is significant at 0.01 level (table-3).

Physical and mental health - Pre mean and post mean value of the group is 18.42 and 12.2 respectively and the t value received is 9.14 which is significant at 0.01 level (table-4).

DISCUSSION

The present study was carried out on 40 participants. Results of the study clearly indicate that hemoglobin level was significantly increased (12.2-13.10, observed t value = 5.61) in the post yoga experimental group. This finding is supported with the studies of Ramnath b et al, (2013)⁸, Sharma KK et al, (2014)⁹, Ramdev S (2009)¹⁰, Tiwari VK (2016)¹¹. They all observed positive result and favour the findings of present study. Various yogic practices including Kapalbhati pranayama squeezes and massages the abdominal viscera and thus produces hypoxia. Hepcidin which is produced by liver is decreased by hypoxia. Hepcidin is elevated during inflammation and/ or infection. This can cause iron dysregulation with hypoferremia and anemia related to inflammatory disease.¹²Erythropoietin is secreted by liver in response to tissue hypoxia and increases the process of erythropoiesis in bone marrow.¹³ A significant reduction in erythrocyte sedimentation rate (ESR) was observed (9.5- 3.45, observed t value = 5.85)

Name of the Test	Mean	Standard Deviation	T value	Significance Level
Pre Test	12.2	1.3	5.61	At 0.01 level
Post Test	13.10	0.71		

Table-1: Effects of Yogic practices on Physiological Parameter

Name of the Test	Mean	Standard Deviation	T value	Significance Level
Pre Test	9.5	6.8	5.85	At 0.01 level
Post Test	3.45	1.7		

Table 2. Effects of Yogic practices on Physiological Parameter

Name of the Test	Mean	Standard Deviation	T value	Significance Level
Pre Test	65.05	9.5	14.63	At 0.01 level
Post Test	88.02	12.46		

Table-3: Effects of Yogic practices on Physiological Parameter

Name of the test	Mean	Standard Deviation	T value	Significance Level
Pre Test	18.42	5.83	9.14	At 0.01 level
Post Test	12.2	5.12		

Table-4: Effects of Yogic practices on Psychological parameter

in post yoga group which is consistent with other studies. Decreased ESR after yoga practice represents the consequence of yoga's antistress effect, reducing the oxidation process and release of free radicals at RBC membrane level.¹⁴ The basic factor influencing the ESR have been understood as a amount of fibrinogen in the blood directly correlates with ESR¹⁵, found to be decreased after yoga training¹⁶. This is all due to imbalance in metabolism, hence practice of yoga not only relax the body, mind and emotions; it regulates the metabolism¹⁷. Increased level of erythrocyte sedimentation rate indicates internal inflammation or infection. The precise mechanism by which the selected yoga package makes alterations in the ESR level is still unclear and has become an important area of research. The main contributor to ESR is acute phase protein which is produced due to acute or chronic inflammation mainly by liver. So the possible mechanism may be due to the positive impact of Kapalbhathi pranayama and Vaman on the abdominal organs especially liver and the stress reducing effects of Bhramri pranayama.

In the present study there was significant increase in forced vital capacity (65.05-88.02, observed t value = 14.63). The Kapalbhathi pranayama involves powerful strokes of exhalation which directs full use of diaphragm and abdominal muscles and hence improves respiratory muscle strength and increases FVC of lung. Murthy et al¹⁸ and Madan Mohan et al¹⁹ in their studies found very similar results and observed that short term yoga and pranayama training in particular in various age groups produced significant improvement in lung ventilator functions in the form of lowered respiration rate, increased forced vital capacity, FEV1, PEFr, maximum breathing capacity and breath holding time.

The mental health parameters are also observed in the present study by physical and mental health questionnaire of S.K.Verma, N.N.Wig and D. Prasad. Values for psychological parameter were 18.42- 12.2, observed t value = 9.14. Physical and mental benefits of yoga are witnessed in the present study with the help of Kapalbhathi, Bhramri and Vaman therapy. So the selected yoga package provides a dynamic platform for working with emotional health issues. Bhramri pranayama reduces anxiety, stress, aggression, insomnia, depression and very useful after neurosurgery.

Indeed the scientific investigations on experimental group demonstrate the role of selected yoga package on the physiological and psychological parameters. Lack of control group and short duration of the study were the major limitations.

CONCLUSION

The major findings were decreased level of erythrocyte sedimentation rate (ESR) and mental health parameters with improvement in hemoglobin percentage and increased value of forced vital capacity (FVC).

This study suggests that Kapalbhathi and Bhramri pranayama with Vaman therapy have an effect on selected physiological and psychological parameters.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 30-09-2020; **Accepted:** 28-10-2020; **Published:** 30-11-2020