

Comparative Study of Yogic Practices and *Vyayama* on Certain Physical and Mental Variables in Healthy Individuals

Research Article

Jyoti Yadav¹, Mamta Tiwari², Rajiv Vyas³, Vineeta Singh⁴, Kanchan Chowdhury^{5*}

1. Medical Officer, Government of Uttar Pradesh, India.

2. Assistant Professor, Department of Swasthavritta and Yoga, Faculty of Ayurveda IMS, BHU. Varanasi. India.

3. Professor, Department of Physical Education, Faculty of Arts, BHU. Varanasi. India.

4. PhD Scholar, Department of Swasthavritta and Yoga, Faculty of Ayurveda IMS, BHU. Varanasi. India.

5. Assistant Professor, Dept. of Swasthavritta and Yoga, Faculty of Ayurveda IMS, BHU. Varanasi. India.

Abstract

Introduction: Now a days, erratic lifestyle, characterised by poor dietary habits, sedentary behaviours, busy schedule and stress have led to rising concerns about physical and mental well-being because these lead to arise of different illnesses condition. There is growing worldwide interest in traditional health practices like Yoga and *Vyayama* (exercise), as they are seen as complementary to conventional medicine. Studying both practices together offers a thorough grasp of how they support mental and physical well-being, resulting in more holistic wellness approaches. **Objective:** The aim of this research is to evaluate the effect of yogic practices and *vyayama* on certain physical and mental variables in healthy individuals. **Material and methods:** About 150 healthy volunteers fulfilling the inclusion and exclusion criteria have been registered randomly in three different groups for total period of 3 months. Three distinct follow-ups were conducted to evaluate changes in various objective parameters i.e., Flexibility, Agility, Body Mass Index (BMI), Muscular Strength and subjective criteria, Mental Health Inventory (MHI) – Multiple Sclerosis Quality of Life Inventory (MSQLI). **Results:** Results of this study showed that *vyayama* had greater effect on physical variables like and yoga had greater effect on mental variables. On intragroup comparison (Wilcoxon Singed Rank Test) there was statistically significant result seen in flexibility, BMI, and mental health in group A. On intragroup comparison there was statistically significant result seen in agility and muscular strength in group B. **Conclusion:** This study shows that the significance of Yoga and *Vyayama* as effective, non-pharmacological interventions for improving certain physical and mental variables. Their natural and holistic approach to enhancing well-being, without any side effects, makes them especially beneficial as preventive health measures.

Keywords: Agility, BMI, Exercise, Flexibility, Mental health inventory, Yoga.

Introduction

Positive health is most essential factor for productive life of an individual and community. The World Health Organization (WHO) defined “Health is a state of complete physical, mental, and social well-being and not merely an absence of disease or infirmity”(1). According to the WHO, mental health is “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (2). As per *Ayurveda*, ‘Health’ is a state of equilibrium of normal function of doshas, dhatus, malas with delighted body, mind and soul (3). *Ayurveda* describes three *gunas* of Mind and named as *Satva*

(Balance), *Raja* (Arrogance) and *Tama* (Indolence). Mind is called ‘*Manas*’. Happiness and miseries are felt due the contact of the souls the sense organs, mind and the objects of senses, both these types of sensations disappear when the mind is concentrated and contained in the soul and the super-natural power in the mind and body reattained. This state is known as yoga according to sages well versed in *Ayurveda* (4). *Ayurveda* gives highest priority for the health promotion through different principles of prevention mentioned in *Dincharya* (daily regimen), *Ritucharya* (seasonal regimen), *Rasayana* (rejuvenation) etc. Among them *Vyayama*(exercise) is one such factor for health promotion. *Laghav* (Lightness of body), *Karma-samarthy* (ability to work), *Sthairya* (stability), *Dukh sahisnuta* (tolerance of difficulties), *Agni vridhhi* (increases the digestive power), *Dosha kshaya* (alleviated of dosha are normalizes) are the benefits of *Vyayama* (5). The modern lifestyle, characterized by sedentary behaviour, faulty diet and dietary patterns, and mental stress, has led deterioration in mental and physical well-being. Clinical evaluation of the effects of Yoga and *Vyayama* offers a non-pharmacological

* Corresponding Author:

Kanchan Chowdhury

Assistant Professor,

Department of Swasthavritta and Yoga,

Faculty of Ayurveda IMS,

BHU. Varanasi. India.

Email Id: dr.kanchan.chowdhury@gmail.com

solution for preventing and managing these well being, helping individuals adopt healthier habits. The purpose of present research Comparative Study of Yogic Practices and Vyayama on Certain Physical and Mental Variables in Healthy Individuals is to systematically investigate and compare the effects of yoga and vyayama (traditional physical exercise) on various physical and mental health parameters in healthy individuals.

Aims and objectives

To evaluate the comparative efficacy of Yogic practices and Vyayama on certain physical variables and mental variables in healthy individuals.

Materials and Methods

Study design

This study was an open randomised prospective interventional study.

Plan of study

About 150 healthy volunteers fulfilling the inclusion and exclusion criteria have been registered from different faculties of BHU from January 2020 to October 2020. Detailed history was taken according to the proforma prepared for the study incorporating all the relevant points from both Ayurveda and modern medical sciences. Every patient's consent statement was taken in a separate format and added to the proforma.

Approval of ethical committee

This study was randomised prospective clinical study. The approval from institutional ethical committee of IMS, BHU was obtained with number (dean/2019/EC/1565), dated 25.09.2019 before commencing of clinical study.

Inclusion Criteria

- Healthy individuals (enrolled by using a specific proforma for Physical and Mental Health) in having age group 20-28 years.
- Both sexes, Without any illness

Exclusion Criteria

- Below 20 years and above 28 years.
- Any systemic illness like Tuberculosis, Hypertension, Diabetes Mellitus etc.
- Any Psychotic disorders, and
- Any recent surgery performed.

Interventions

Individuals from various groups were instructed to implement the following interventions:

- **Group A:** Yoga (1 hour daily for 6 days/week continuously for total period of 3 months).
- **Group B:** Vyayama/Exercises (30minutes daily for 6 days/week continuously for total period of 3 months).
- **Group C:** Control group.

Rationale of treatment

Group A patients were advised to practice Yoga, 1 hour daily for 6 days/week continuously for total period of 3 months. Details of yoga set are presented in Table 1.

Table 1: Yoga set for Healthy Individual		
Yoga	Sets of Asana	Duration
Joint movements	Toes: Flexion and extension Ankle joints: Flexion, extension, rotation Knee Joints: Flexion, Extension, Rotation Hip Joints: Hip Rotation, Circumduction Hand: Flexion and extension of fingers Wrist Joints: Flexion, Extension, Rotation Elbow: Flexion and extension Shoulder Joints: Rotation Neck: Bending forward & backward, Right, Left, and Rotation	5 rounds for each joint bilaterally for period 10 minutes
Standing Asanas (Standing Pose)	Tadasana (Mountain Pose), Trikonasana (Triangle pose), Katichakrasana (Standing Spinal Twist), Padahasthasana (Hand to Foot pose), Ardachakrasana (Half Wheel Pose)	5 rounds for each Asana for period 10 minutes
Sitting Asanas (Sitting Pose)	Vajrasana (Thunderbolt pose), Shasankasana (Rabbit-Pose), Janushirshasana (Head to knee pose), Pashimottanasana (Seated forward bend)	5 rounds for each Asana for period 10 minutes
Prone position Asanas	Bhujangasana (Cobra pose), Shalabhasana (Locust Pose), Dhanurasana (Bow Pose)	5 rounds for each Asana for period 5 minutes
Supine Position Asanas	Pavanmuktasana (Wind-releasing Pose), Naukasana (Boat pose), Shavasana (Corpse Pose)	5 rounds for each Asana for period 5 minutes
Pranayama	Nadishodhana (psychic network purification), Bhramari (Humming bee breath)	20 rounds for each Pranayama for period 10 minutes
Dhyana (Meditation)	Omkara Dhyana	10 minutes

Group B patients were advised Vyayama/ Exercises daily in morning for 30 minutes for 6 days/ week at least for 3 months). Details set of Vyayama/ Exercise are presented in Table 2.

Exercise	Set of Exercises	Duration
Strength	Push-ups (for upper body), half squat (for lower body), vertical and horizontal jump -	5 rounds each
Flexibility	Sit and reach, slow hold and stretch method.	5 rounds each
Agility	-	10 yards.

Group C were Control group. Individuals of this group were advised nothing.

Criteria for assessment

The efficacy of interventions was assessed on the basis of changes observed in subjective and objective parameters, by giving them appropriate scoring according their gradation.

Subjective criteria

- MENTAL HEALTH INVENTORY(MHI) – Multiple Sclerosis Quality of Life Inventory (MSQLI).

Objective criteria

- Body Mass Index (BMI), Muscular strength, Agility and Flexibility.

Follow-up

Total three follow ups of patients of all three groups were documented on the basis of assessment criteria, at an interval of 30 days each, for a total period of three months. Prior to completion of study, 15

individuals were dropped (6 in Group A, and 9 in Group C) at different follow up.

Statistical methods of evaluation

The collected data was tabulated in the master chart and analysed with the help of SPSS 20.0 version software to the result. Paired test was applied to see the significant changes from baseline to different follow up and Z test was used to find out the significant difference between the proportions. For Intra group comparisons of ordinal variable and dichotomous variable Chi-squared test was applied. Analysis of variance (ANOVA) followed by post hoc was used for comparison between various groups. Mean SD was calculated for various physical and mental variables measured on continuous scale. For various subjective parameters no. and percent of cases were determined for all the three groups. Paired t test was applied for Intra group comparison where as one way ANOVA was applied for Intergroup comparison.

Observations and Results

Observation of flexibility revealed that reduction in mean was of (1.646) in group C and increase was of (0.926) in group B and (2.736) in group A. Comparatively group A shows better improvement in Flexibility followed by group B but group C shows decrease in Flexibility. On intergroup comparison, the results were statistically highly significant ($p < 0.001$) at each follow up (Table-3).

Table 3: Effect of intervention on Flexibility of 150 healthy individuals

Groups	Flexibility mean±SD				Within the group comparison paired test BT-FU ₃
	BT	FU ₁	FU ₂	FU ₃	
Group A	3.64 ±2.981	4.77 ±3.018	5.70 ±3.009	6.38 ±2.961	-2.736±1.228 t=-15.758; p=0.000
Group B	10.12 ±3.654	10.45 ±3.545	10.76 ±3.451	11.04 ±3.351	-0.926±.639 t=-10.250; p=0.000
Group C	2.73 ±2.123	1.89 ±1.907	1.38 ±1.674	1.08 ±1.652	1.646±1.559 t=7.468; p=0.000
Between the group comparison one-way ANOVA	F = 91.061 p = 0.000	F = 112.536 p = 0.000	F = 139.312 p = 0.000	F = 164.055 p = 0.000	
Post hoc test A v/s B A v/s C B v/s C	p = 0.000 p = 0.384 p = 0.000	p = 0.000 p = 0.000 p = 0.000	p = 0.000 p = 0.000 p = 0.000	p = 0.000 p = 0.000 p = 0.000	

There was increase in Agility in group C (0.4592) but with maximum decrease in Agility (0.4660) in group B followed by decrease of (0.3440) in group A. Comparatively group B is better able to improve Agility. On intergroup comparison, the results were statistically highly significant at ($p < 0.001$) at each follow up (Table-4).

Table 4: Effect of intervention on Agility of 150 healthy individuals

Groups	Agility mean±SD				Within the group comparison paired test BT-FU ₃
	BT	FU ₁	FU ₂	FU ₃	
Group A	14.01 ± 1.505	13.822 ± 1.5724	13.724 ±1.6169	13.668 ±1.6472	0.3440±.3483 t= 6.984; p=0.000
Group B	9.95 ± 1.195	9.810 ±1.1463	9.640 ±1.0930	9.486 ±1.0585	0.4660±.2502 t= 13.170; p=0.000
Group C	13.87 ±0.946	14.062 ±0.9487	14.200 ±0.9555	14.328 ±0.9672	-0.4592±.2832 t= -11.466; p=0.000
Between the group comparison one-way ANOVA	F = 173.565 p=0.000	F = 182.624 p=0.000	F = 199.582 p=0.000	F = 216.860 p=0.000	
Post hoc test					
A v/s B	p= 0.000	p=0.000	p=0.000	p=0.000	
A v/s C	p= 1.000	p=1.000	p=0.179	p=0.029	
B v/s C	p=0.000	p=0.000	p=0.000	p=0.000	

There was increase in BMI in group C (1.4540) whereas decrease in BMI (0.6980) in group B with maximum decrease (1.7460) in group A. Comparatively group A is better able to maintain Body mass index in normal range. On intergroup comparison, the results were statistically significant (P<0.05) before intervention and highly significant (P<0.001) at different follow up (Table-5).

Table 5: Effect of intervention on Body mass index of 150 healthy individuals

Groups	Body mass index mean±SD				Within the group comparison paired test BT-FU ₃
	BT	FU ₁	FU ₂	FU ₃	
Group A	23.332 ± 2.4971	22.63 ± 2.251	21.980 ±1.8361	21.59 ±1.551	1.7460±1.4750 t= 8.370; p=0.000
Group B	21.998 ± 2.0703	21.84 ± 1.708	21.586 ±1.2262	21.30 ±0.921	0.6980±1.4581 t= 3.385; p=0.001
Group C	22.916 ±2.7023	23.52 ±2.621	24.044 ±2.5044	24.37 ±2.467	-1.4540±.8117 t= -12.666; p=0.000
Between the group comparison one-way ANOVA	F = 3.921 p= 0.022	F = 7.150 p=0.001	F = 23.453 p=0.000	F = 46.198 p=0.000	
Post hoc test					
A v/s B	p= 0.021	p=0.234	p= 0.925	p= 1.000	
A v/s C	p= 1.000	p=0.141	p=0.000	p=0.000	
B v/s C	p=0.185	p=0.001	p=0.000	p=0.000	

Observation of muscular strength revealed that reduction in mean was of (3.340) in group C and increase was of (6.560) in group B and (3.920) in group A. Comparatively group B shows better improvement in Muscular strength followed by group A but group C shows fall in Muscular strength. On intergroup comparison, the results were statistically significant (p<0.001) at different follow up (Table-6).

Table 6: Effect of intervention on Muscular strength of 150 healthy individuals

Groups	Muscular strength mean±SD				Within the group comparison paired test BT-FU ₃
	BT	FU ₁	FU ₂	FU ₃	
Group A	23.98 ±4.934	25.68 ±4.855	27.18 ±5.259	27.90 ±5.392	-3.920±1.816 t= -15.260; p=0.000
Group B	42.70 ±6.674	44.88 ±6.130	47.30 ±5.687	49.26 ±5.333	-6.560±2.159 t= -21.489; p=0.000
Group C	23.72 ±3.017	22.26 ±2.877	20.92 ±2.892	20.38 ±2.806	3.340±1.975 t= 11.955; p=0.000
Between the group comparison one-way ANOVA	F = 227.830 p=0.000	F = 321.214 p=0.000	F = 416.886 p=0.000	F = 514.965 p=0.000	
Post hoc test					
A v/s B	p=0.000	p=0.000	p=0.000	p=0.000	
A v/s C	p= 1.000	p=0.002	p=0.000	p=0.000	
B v/s C	p=0.000	p=0.000	p=0.000	p=0.000	

Observation of mental health revealed that reduction in mean was of (38.220) in group C and increase was of (35.800) in group B and (44.960) in group A comparatively group A shows better improvement in mental health [Mental health inventory which was assessed by Multiple Sclerosis Quality of Life Inventory (MSQLI)] followed by

group B but group C shows fall in mental health. On intergroup comparison, the results were statistically significant ($p < 0.001$) at each follow up (Table-7).

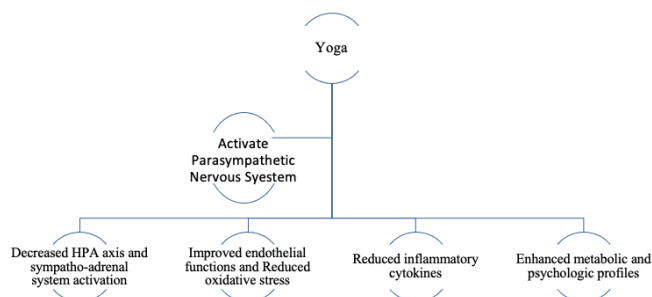
Table 7: Effect of intervention on Mental health [Mental health inventory which was assessed by Multiple Sclerosis Quality of Life Inventory (MSQLI)] of 150 healthy individuals

Groups	Mental health inventory mean±SD				Within the group comparison paired test BT-FU ₃
	BT	FU ₁	FU ₂	FU ₃	
Group A	48.36 ±11.547	65.58 ± 9.392	80.24 ±7.966	93.32 ±5.085	-44.960±9.655 t=-32.927; p=0.000
Group B	45.64 ± 2.538	57.36 ± 2.554	69.92 ±2.546	81.44 ±2.287	-35.800±2.688 t=-94.181; p=0.000
Group C	77.10 ±9.801	64.28 ±6.459	51.78 ±4.278	38.88 ±3.186	38.220±8.735 t= 30.940; p=0.000
Between the group comparison one-way ANOVA	F= 193.268 p=0.000	F= 21.464 p=0.000	F= 352.913 p=0.000	F= 2980.652 p=0.000	
Post hoc test					
A v/s B	p= 0.382	p=0.000	p=0.000	p=0.000	
A v/s C	p= 0.000	p= 1.000	p=0.000	p=0.000	
B v/s C	p=0.000	p=0.000	p=0.000	p=0.000	

Discussion

Flexibility and Agility Muscular strength, the results were statistically found highly significant at each follow up by doing exercises on regular basis. Yoga and Exercise on BMI of individual were found statistically significant results. Mental Health variables also improved after interventions of Yoga and Exercises.

Mode of action of yoga (6)



Additionally, it was discovered that a brief yoga-based relaxation program normalises autonomic nervous system function by directing both the parasympathetic and sympathetic indices toward the more "normal" middle range of reference values (7). Research demonstrates that yoga lowers plasma rennin levels, blood glucose (8), salivary cortisol (9), and 24-hour urine nor-epinephrine and epinephrine levels. Systolic and diastolic blood pressure, as well as heart rate (10), are considerably reduced by yoga. According to this research, *yoga* can immediately calm the HPA axis in reaction to stress. In Type II DM, yoga practice is directly linked to increased insulin sensitivity to glucose signals. It lessens the detrimental correlation between obesity, a larger waist circumference, dyslipidaemia, and other conditions that lead to insulin resistance (11).

Probable mode of action of *Yyayama* (12)

Yyayama develops musculature by improving circulation to all body parts. It gives massaging effect

over the vital organs like liver, pancreas, spleen, stomach and secretes the digestive juices and enzymes. It also enhances the digestive capacity and increases the carbohydrate metabolism (glycolysis) and Lipolysis of accumulated adipose tissue, (gluconeogenesis). Perspiration takes out the accumulated toxins from the body. *Yyayama* makes body to feel light and active. It increases oxygen supply to remote tissue and also increases basal metabolic rate. Robust epidemiological evidence shows that exercise training can lower disease risk and mortality for a number of cancer diagnoses, implying that exercise training may directly control tumour metabolism and physiology (13).

Conclusion

Daily practice of selected *yogasana*, *pranayama*, helped in reducing stress, and negative thoughts, and giving positive energy. Daily practice of selected *vyayama*, helped in reducing weight, laziness, and thus increasing enthusiasm, strength, flexibility, agility etc. But as comparatively *vyayama* have much effect on physical variables and yoga has much effect on mental variables. The future perspective for these interventions is that it is non-pharmacological and absence of any side effects, which is really a great benefit to the individuals and is of vital importance in view of global acceptance of 'Swasthavritta and Yoga' as prevention module.

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