

Synergistic Approach Of Applied Physiology & Yoga To Combat Lifestyle Diseases

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Abstract

The modern age is 'the age of stress' and stress related diseases, which pose a serious challenge to not only medical professionals but to the whole concerned diasporas. In spite of the leaps and bounds in medical sciences, we are surrounded by a very silent but dangerous foe, lifestyle diseases. In our own nation, the sad truth is now out - India is headed to become the Diabetic capital of the world. The younger generation i.e. the under 40 age group are up to 10 times more prone to cardiovascular diseases as compared to the corresponding age group in the west. According to an alarming estimate, around the year 2025 A.D., about 91 young people would die per hour from heart related diseases! Diseases directly linked to modern lifestyle like Diabetes, coronary artery diseases, hypertension, obesity, eating disorders, mood disorders, mental illness, psychosomatic disorders, etc are a great threat to human life and constitute the major bulk of morbidity and mortality of the 21st century. Our diet has changed from high fiber, low fat to high fat, low fiber type processed food. Other potent negative factors are decreased physical activity, addiction to smoking, alcohol, drugs, etc. which further lead to obesity, insulin resistance and atherogenic dyslipidemia. This vicious cycle is further compounded by stress and consequent stress related diseases. Stress affects the body through Psycho-neuro-endo-immuno-cyto-axis. Initially during stress, the sympathetic nervous system is activated and via nervous and hormonal responses, the same copes with emergency. However, chronic stress has a very deleterious effect on the body and may enhance development of the lifestyle related diseases named above. Stress and its devastating sequel can be dealt with by reducing and later curing the lifestyle disorders by drastic dietary changes, mind-body therapies including meditation, stress relaxation techniques and yoga. The need of the moment is that Physiologists take a step forward and apply their knowledge of physiology of stress to show stressed masses the path to mental and physical salvation. Applied Physiology has already blended the ancient traditional Indian medicine modalities with modern medical science integrating Body, Breath and Mind well with natural herbs and the science of Ayurveda. The present study was conducted on 60 young and asymptomatic M.B.B.S. students to assess the effect of Shavasana on the recovery process from Cold Pressor Test (CPT) induced stress by recording blood pressure, pulse rate, respiratory rate and rate pressure product i.e. all important cardio-respiratory parameters. All these parameters were recorded in three settings both before and after CPT. Ten minutes of Shavasana showed lowering of all basal parameters in comparison to supine posture which further lowered ($p < .05$) after long term (4 weeks) Shavasana training. Stress induced by CPT caused rise in all parameters in all three settings; this rise, however, was blunted after 10 minutes of Shavasana and even more after Shavasana training for 4 weeks ($p < .05$). Shavasana increases parasympathetic tone, gradually reducing the sympathetic drive as training is carried on. Thus continued Shavasana training induces modulation in sympathetic responses to stress enabling the individual to face stress more effectively. Thus, the need of the hour is a daily dose of a Holistic health capsule, ingredients of which are traditional lifestyle, Holistic diet & Yoga harmonizing our Pranic ability and mental energy flow by clearing any blockages in the subtle body leading to mental equilibrium and calmness.

INTRODUCTION

Modern age is the age of stress and stress induced disorders, which are posing a great challenge to the present society₁. In spite of vastly improved technology, minimal risk surgical interventions and life saving wonder drugs, we still face a very dangerous foe in the form of 'life style disorders' – a self created mess of our bodily environs. In our own country,

a terrible truth is out in the open- India is heading to become the Diabetic capital of the world. The younger generation i.e. the under 40 age group are up to 10 times more prone to cardiovascular diseases as compared to the corresponding age group in the west. According to a horrifying but not exaggerated estimate, around the year 2025 A.D., about 91 young people would die per hour from heart related diseases! Diseases directly linked to modern life style like

diabetes, coronary artery diseases, hypertension, obesity, eating disorders, mood disorders, mental illnesses, psychosomatic disorders, etc. are a great threat to human life and constitute the major bulk of morbidity and mortality of the 21st century. There is a remarkable transition in the lifestyle patterns of majority of Indians.

Opening up of the market with influx of all that is considered chic and modern into our homes and kitchens has taken its toll on our traditional healthy living routine. Our dietary pattern has changed from high fibre, low fat, natural diet to low fibre, high fat, processed food. Denis Parsons Burkitt, the celebrated British surgeon, concluded that many Western diseases which were rare in Africa were the result of diet and lifestyle. He wrote a book *Don't Forget Fibre in your Diet* (1979), which was an international best seller; one study showed that people who eat very low levels of fiber--less than 10 grams per day--had an 18 percent higher risk of colorectal cancer.

A recent survey conducted by the WHO "Preventing Communicable Diseases in the workplace through diet and physical activity"², has highlighted the financial aspects 'of rise of lifestyle diseases like diabetes, stroke & cancer because of unhealthy workplaces' even in developing nations like ours. According to this report, the economic loss in India which was \$ 8.7 billion in 2005 is projected to rise to \$ 54 billion in 2015. Promoting the concept of a healthy workplace, the report said targeting physical inactivity and unhealthy dietary habits are effective in improving health-related outcomes, such as obesity, diabetes and cardiovascular diseases.

As such, the role of televisions, videos, computers and the newly emerging digital gizmos is beyond debate in bringing down physical activity and causing us to become virtual couch potatoes. This vicious cycle is compounded by stress and consequent stress related diseases.

What is stress?³ Stress, itself is defined as 'the non-specific response of the body to any factor which threatens the body's abilities to maintain homeostasis. The term 'stress' in this context was coined by Austro-Canadian Endocrinologist Hans Selye, who defined the General Adaptation Syndrome or GAS paradigm in 1936.

STAGES OF STRESS

Alarm: The 1st stage. When the stressor is identified, the body's stress response is a state of alarm. Adrenaline is produced to bring about the fight or flight response. Also

some activation of the HPA axis produces cortisol.

Resistance: The 2nd stage. If the stressor persists, the body begins to try to adapt to the strains of the environment & cannot keep this up indefinitely, so its resources are gradually depleted.

Exhaustion: The 3rd stage. All the body's resources are eventually depleted and the body is unable to maintain normal function. At this point the initial symptoms may reappear (sweating, raised heart rate etc.). If extended, long term damage results as the capacity of glands and the immune system is exhausted resulting in decompensation manifesting into illnesses e.g. ulcers, depression, cardiovascular problems, and mental illnesses.

STRESSORS

Agents/situations which induce the response are called stressors; the state induced by these stressors is stress.

Figure 1

Physical	Chemical	Physiological	Pathological	Infectious	Psychological	Social
Trauma	Decreased O ₂ supply	Heavy exercise	Pain	Bacterial invasions	Anxiety	Personal conflicts
Surgery	Acid base imbalance		Shock		Fear	Change in life style
Intense heat			Hemorrhage		Sorrow	
Intense cold						

When stressors are recognized both nervous & hormonal responses bring about defensive measures to cope with emergencies

STRESS RESPONSE:

Sympathetic nervous system is activated; being a biological survival mechanism built in human system. In short term, these pathways are important for physical survival but when these pathways are employed continuously due to chronic stressors the effects can be devastating. Chronic stress has deleterious effects on the body and may enhance development of certain diseases, i.e. Atherosclerosis, Hypertension, Diabetes mellitus & decreased immunity resulting in infections, Gastric ulcers, Bronchial asthma, Psycho-neurosis, etc.

Figure 2

Responses	Hormones released	Symptoms	Duration of metabolic response
Immediate	Epinephrine & nor-epinephrine from sympathetic nervous system which is activated by hypothalamus	Responsible for fight or flight; ↑ respiratory rate, ↑ heart rate, dilation of pupil, ↓ digestive activity,	2-3 seconds
Intermediate	Epinephrine & nor-epinephrine from adrenal medulla on stimulation by posterior hypothalamus	Re-enforces the efforts of sympathetic drive	Release is via blood stream 20-30 seconds rather than neural endings, therefore travel time is longer.
Prolonged	ACTH, vasopressin & thyroxine via neuro-endocrine pathways.	ADH- regulates fluid loss ACTH- acts on adrenal cortex, corticosteroids ↑ metabolism Thyroxine- ↑ metabolism; ↑ BMR	Minutes, hours, days or weeks.

Symptoms of stress- Short term: Increased heart beat, increased sweating, cool extremities, nausea, rapid breathing, tense muscles, dry mouth, diarrhea, irritability, anxiety. Long term: change in appetite, digestive problems, headache, skin eruptions, sexual dysfunctions, aches & pains, tiredness, heart ailments, seizures, insomnia.

COMBATING STRESS

Lifestyle diseases can be lowered with changes in diet, lifestyle and environment, mind-body therapies like meditation, stress relaxation technique, yoga, etc. Looking at the emerging scenario, we physiologists have to come forward, apply our knowledge of the physiology of stress to enlighten modern man- in terms of physical and mental fitness. The integral health and holistic medicine clinics now are a part of our responsibility and our goal is to reduce morbidity, disability and premature deaths due to lifestyle diseases. Applied physiology has already blended ancient Indian system of medicine with modern science which integrates Body, Breath and Mind along with nature’s herbs & science of Ayurveda.

USER FRIENDLY APPROACH OF HEALTHY & HAPPY LIFESTYLE

A. Be Natural- Stress management through yoga

“Yoga Bhavata Dukaha”⁵⁶ Indian sages believe that yoga alone can destroy all the internal & external pains. It is claimed to endow perfect physical, mental & spiritual well being to its practitioners. Since psychosomatic disorders stem from inability to control the mind, the practice of yoga can lead to transformation of the mind. The entire yoga enunciated by Lord Sri Krishna in the Bhagvadgita can be summarized in 4 principles:

- Ast- Introspection and eliminating shortcomings.
- Vayast- Keeping busy in public service oriented

activities.

- Swasthya- keeping good health.
- Mast- staying cheerful & happy by living in the present.

Stressed out individuals carry a great deal of physical tension. In these cases, the natural unblocking effects of Yogic postures are helpful. The benefits of breathing (Pranayama), Yogic postures (Asanas) & meditation (Dhyana) include increased body awareness, release of muscular tension and increased coordination between mind and body.

Yogic Breathing Techniques (Pranayama): the ancient Indian therapeutic traditions as well as modern medical research have shown how natural healthy respiration not only increases longevity and supports our overall well being and self development but also helps in medical conditions like asthma, indigestion, insomnia, hypertension, anxiety, panic.

EFFECT OF STRESS ON NORMAL BREATHING PATTERNS

Normal: With each inhalation, O₂ enters into our body, purifies the blood streams and helps invigorate each cell and healthy functioning of the cells, glands and muscles. When breathing is slow, deep and full, lungs work more; the diaphragm moves well, the intercostal, back and abdominal muscles work, drawing in extra O₂ into the blood stream

Stress: Under stress- symptoms like tightening of muscles, distractions, anxiety and angry reactions occur. Breathing becomes quick and shallow -with restricted breathing inflow of O₂. Lungs are unable to exhale the stale air and residual toxins build up inside the body.

Affects: Healthy regeneration of cells is deranged. O₂ starved cells are the major contributing factor in cancer, immunity deficiencies, heart diseases and strokes.

Pranayama- {Prana + Ayama}: Prana- explained as vital life force that regulates all activities in this universe; Ayama- control or regulation. Pranayama consists of various ways of inhaling, exhaling and retention of Prana. It was devised by ancient Yogic masters to create synergy between the self energizing life force and individual mind-body-spirit by scientific regulation of Prana. The simplest form of Pranayama is Nadishoddhana (channel purification/cleansing or alternate nostril breathing): There are a total of 14 major

nadis in the human body (a nadi is a subtle nerve channel through which Prana flows). The benefits are manifold; conscious breathing through cleansed nadis allows more O₂ inflow & effective excretion of toxins from within. This brings about a healthy state both in body and mind.

YOGIC MEDITATION (DHYANA)

This is the practice involving control of the mental functions, which start from the initial withdrawal of the senses from external objects to the complete oblivion of the external environment. The basic principle of meditation is to develop internal awareness. This ancient path to enlightenment if practiced for limited periods daily proves helpful in reducing stress, anxiety & raised blood pressure along with improving concentration and creativity besides bringing relief.

YOGIC POSTURES (ASANAS)

Hatha Yoga Pradipika written by Swami Swatmarama, a disciple of Swami Gorakhnath says “from asanas arises steadiness of body & mind, freedom from disease & lightness of limbs”. The aim of Asanas is to create a free flow of life energy in and out of the body in order to perfect its functioning. Since psychosomatic diseases stem from inability to control the mind; Yogic techniques in general and Shavasana in particular are known to promote psychosomatic health and enhance one’s ability to combat stressful situations. The Sanskrit term “Shava” means dead body while “Asana” means posture; thus Shavasana means the dead body or corpse posture. Yogic techniques in general and Shavasana in particular are known to promote psychosomatic health and enhance one’s ability to combat stressful situations. Relaxation decreases anxiety and depression enhances self awareness, prevents exhaustion and protects the heart and other organs and muscles from excessive strain. The Sanskrit term ‘Shava’ means- dead body while ‘Asana’ means- posture. Therefore Shavasana means the dead body/corpse posture.

BENEFITS OF SHAVASANA

Reduces muscle tension, improves venous circulation, tones whole nervous system and relieves fatigue, breathing becomes slow, deep and rhythmic.

Shavasana along with pranayama mainly Kapalbhathi and Anulom-Vilom (alternate nostril breathing) can cure Hypertension, Cardiac ailments, respiratory problems, hormonal imbalances, etc

My study was to assess the effect of Shavasana on recovery

process from cold pressor induced stress in the 1st year MBBS students of age group 18-25 years in the Department of Physiology, HIMS, Dehradun by estimating cardio-respiratory parameters i.e. Systolic and Diastolic Blood pressure, Respiratory rate, Pulse rate and Rate pressor product.

The parameters were recorded in three settings, both before and after stress induced by the cold pressor test (CPT):

Simple lying down and CPT.

Shavasana for 10 minutes and CPT.

After training of Shavasana for 4 weeks and CPT.

Results:

10 minutes of Shavasana showed lowering of all basal parameters in comparison to supine position which further lowered ($p < 0.05$) after long term Shavasana training for 4 weeks.

Stress induced by CPT produced rise in all three settings, the rise was reduced after Shavasana for 10 minutes and least after 4 weeks of Shavasana training.

Conclusion: It is inferred that stress increases the sympathetic component of the ANS. Shavasana increases parasympathetic tone, gradually reducing the sympathetic drive as training is continued so persons doing Shavasana regularly can combat stress better as compared to persons not doing so, as it results in better balance between sympathetic and parasympathetic nervous systems.

B. Eat natural: Dietary patterns and lifestyle factors are associated with mortality from all causes, coronary heart disease, cardiovascular diseases, and cancer, but few studies have investigated these factors in combination. Soy-bean-protein diet, legumes, nuts and soluble fibre significantly decrease total cholesterol, low-density lipoprotein cholesterol and triglycerides. Diets rich in fibre and complex carbohydrate, and restricted in fat, improve control of blood glucose concentration, lower insulin requirement and aid in weight control in diabetic patients. An inverse association has been reported between nut, fruit, vegetable and fibre consumption, and the risk of coronary heart disease. Patients eating a vegetarian diet, with comprehensive lifestyle changes, have had reduced frequency, duration and severity of angina as well as regression of coronary atherosclerosis and improved coronary perfusion. Low fat, high fibre vegetarian diet, plenty of fresh fruits, vegetables,

nuts, sprouts, lemon are recommended. Avoid fried food, red meat, egg yolk, maida, tea, coffee, etc in excess. Eat your food in silence rather than talking between meals or watching T.V.

C. Be in the lap of nature: Moderate aerobic exercise, brisk morning walk. (Queen of all exercises) & evening strolls before sunset.

D. Enjoy proper sleep: The Ministry of Health, Labor and Welfare in Japan proposed a plan called "Health Japan 21," which adopted sleep as one of the specific living habits needing improvement. This has led to increased interest in mental health needs at community public health sites. In addition, it was reported from a recent 2000 survey that one in five Japanese, and one in three elderly Japanese, suffer from insomnia. Women who get too little - or too much - sleep could be damaging their hearts, according to a study.

Research suggests that sleeping five hours a night or less is linked with a higher risk of coronary heart disease¹⁰.

Try to sleep at or about 10 p.m. and get up at 5 a.m. Hormones which create harmony in our body secrete in balance if we enjoy proper sleep which is very important to charge our cerebral batteries.

Thus, the need of the hour is a daily dose of a Holistic health capsule, ingredients of which are traditional lifestyle, Holistic diet, Yoga and adequate sleep harmonizing our Pranic ability and mental energy flow by clearing any blockages in the subtle body leading to mental equilibrium

and calmness.

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References

1. Anand BK. Yoga and the medical sciences. *Ind J Physiol Pharmacol*, 1991; 35: 84-87.
2. UNHEALTHY JOBS TO COST INDIA \$ 237 b; *The Times of India*, dated May the 21st, 2008.
3. Sherwood L. The Peripheral endocrine glands. IN: *Human physiology from cells to systems*. 6th Ed, 2007. Thomson Brookes/Cole New Delhi; 698-701.
4. Gordon NP, Sobel DS, Tarazona EZ et al. Use of an interest in alternative therapies among adult primary care clinicians and adult members in a large health maintenance organization. *West J Med*, 1998; 169: 153-61.
5. Gopal KS, Bhatnagar OP, Subramaniam N et al. The effect of Yogasanas and pranayama on blood pressure, pulse rate and some respiratory functions. *Ind J Physiol Pharmacol*, 1973; 17: 273-76.
6. Patel C, Cryodon S. Randomised controlled trial of yoga and bio-feedback in management of hypertension. *The Lancet*, 1975; 93-95.
7. Kim T. B. Knoop, Lisette C. P. G. M. de Groot, Daan Kromhout, et al. Mediterranean Diet, Lifestyle Factors, and 10-Year Mortality in Elderly European Men and Women- The HALE Project. *JAMA*. 2004;292:1433-1439.
8. M. Segasothy and P.A. Phillips. Vegetarian diet: panacea for modern lifestyle diseases? *QJM: An International Journal of Medicine*; 92 (9): 531-544.
9. H . Tanaka , S . Shirakawa. Sleep health, lifestyle and mental health in the Japanese elderly Ensuring sleep to promote a healthy brain and mind. *Journal of Psychosomatic Research*. 56(5): 465 - 477
10. <http://news.bbc.co.uk/2/hi/health/2701485.stm>.

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