CHAPTER I

INTRODUCTION

1.1 Background of the Study

Adolescent years are the phase of life when individual is exposed to the world outside. In the ladder of education from nursery to university, examination anxiety is almost universal. In fact, anxiety is a basic human emotion consisting of fear and uncertainty that typically appears when an individual perceives an event as being a threat to the ego or self-esteem (Sarason, 1988)[1]. In some instances, such as overcoming dangerous situations, certain level of anxiety can be helpful. However, extreme level of anxiety may produce unwarranted results such as upset stomach, headache, loss of focus, fear, irritability, anger and even depression. When students develop an extreme fear of performing poorly on an examination, they experience anxiety. Anxiety prior to examination is a major factor contributing to a variety of negative outcomes including psychological distress, academic underachievement, academic failure, and insecurity (Hembree, 1988)[2]. Many students have the cognitive ability to do well on exams but may not do so because of high levels of pre-examination anxiety. Because of the societal emphasis placed on testing, this could potentially limit their educational and vocational opportunities (Zeidner, 1998)[3]. Stressful emotions can inhibit a student's ability to absorb, retain and recall information. Anxiety creates a kind of "noise" or "mental static" in the brain that blocks our ability to retrieve what is stored in memory and also greatly impairs our ability to comprehend and reason. The key to understanding how anxiety inhibits cognitive and physical

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[1] I. G. Sarason, "Anxiety, self-preoccupation, and attention." Anxiety Research, 1, 1988, pp. 3-7.

[2] R. Hembree, "Correlates, causes, effects, and treatment of test anxiety." Review of Educational Research, 58, 1988, pp.7-77.

[3] M. Zeidner, Test anxiety: The state of the art. New York: Plenum Press. 1998.

performance lies in understanding how emotions affect the rhythmic activity in the nervous system (www.education.com/reference/article).

Further, in Indian education system, the higher secondary level of education is very important because this level provides the base for future education and students face excessive anxiety. Students have anxiety about their marks, performance and also for their academic achievement. The board exam is the fear in itself. On one hand they wish to secure good percentage of marks for getting admission for their future education and the other hand they also want to prove themselves better than others in this highly competitive age. Sometimes children are pressurized by their parent's expectations, so they suffer from pre-examination anxiety. Examination anxiety (EA) is the distress one experiences when being evaluated or when thinking about prospective evaluations, which typically lead to reduced performances. In fact, academic examinations have been considered as one of the most acute stresses experienced by students (Deinzer *et al*., 2000; Lacey *et al*., 2000)[4,5]. Acute stress has been reported to increase the activity of the hypothalamus-pituitary adrenal (HPA) axis with subsequent rise in cortisol level (Kirschbaum and Hellhammer 1994)[6]. Cortisol is the major stress hormone of the body, and is a glucoroticoid (steroid hormone) released from the adrenal cortex in response to the presence of adrenocorticotropic hormone (ACTH) (Ganong 2005)[7]. When the body undergoes a stressful event, CRH (corticotrophin releasing hormone) is released from the hypothalamus, triggering the production and secretion of ACTH from the anterior pituitary into the blood

[4] R. Deinzer, C. Kleineidam, R. Stiller-Winkler, H. Idel, and D. Bachg, "Prolonged reduction of salivary immunoglobulin A (sIgA) after a major academic exam." International Journal of Psychophysiology, 37, 2000, pp.219-232.

[5] K. Lacey, M. D. Zaharia, J. Griffiths, A. V. Ravindran, Z. Merali, and H. Anisman, "A prospective study of neuroendocrine and immune alterations associated with the stress of an oral academic examination among graduate students." Psychoneuroendocrinology, 25, 2000, pp.339-356.

[6] C. Kirschbaum, and D. H. Hellhammer, "Salivary cortisol in psychoneuroendocrine research: recent developments and applications." Psychoneuroendocrinology, 194, 1994, pp.313-333.

[7] W. F. Ganong, Review of medical physiology. (1st ed. 1989). 22, 2005, pp.248-250.

stream (Herman, *et al*., 1997)[8]. ACTH triggers the secretion of cortisol from the adrenal cortex, which leads to numerous changes in the physiology of the body so that it can respond to stress such as permissive effect of catecholamines, which results in the rearrangement of blood flow to brain, heart and skeletal muscles, alertness, and more. DHEA (dehydroepiandrosterone) is also a steroid hormone along the same synthetic pathway as cortisol. DHEA is considered a sex hormone since it is the precursor to all the sex hormones like testosterone, estrogen, progesterone etc. (Wellman, *et al*. 1999)[9]. In this study DHEA is also considered as previous studies have shown it to have anxiolytic effects. DHEA is a good stress barometer, because when stress levels go up, DHEA levels go down.

Furthermore, previous research reports suggest that cortisol concentration and its rates of excretion increase in students during periods of examination stress (McEwen 1998)[10]. As stress levels increase, the adrenal glands respond by increasing cortisol production and decreasing DHEA (Dehydoepiandrosterone) production. Research conducted by Boudarine, Legros and Timsit-Berthier (2002)[11] demonstrated that high level of anxiety was associated with an increase in cortisol, while low level was related to an exclusive rise in DHEAS.

Nevertheless, examination anxiety affects all of us and it is perfectly natural to experience it. When it goes beyond limit, it causes depression and sometimes may cause suicidal ideation. Hence, there is need to develop a programme which can cope up pre-examination anxiety.

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[8] J. P. Herman, and W. E. Culliman, "Neurocircuitry of stress: central control of the hypothalamo-pituitary-adrenocortical axis." Trends in Neuroscience, 20, 1997, pp.78-84.

[9] M. Wellman, L. Shane-McWhorter, P. L. Orlando, and J. P. Jennings, "The role of dehydroepiandrosterone in diabetes mellitus." Pharmacotherapy, 19, 5, 1999, pp.582-591.

[10] B. S. McEwen, "Protective and damaging effects of stress mediators." New England Journal of Medicine, 338, 1998, pp.171–179.

[11] M. Boudarene, J. J. Legros, and M. Timsit-Berthier, "Study of the stress response: role of anxiety, cortisol and DHEAs." Encephale, 28, 2, 2002, pp.139-146.

In this context yoga seems to be effective for reduction of excessive stress, depression and anxiety. Although practice of yoga, has received less attention in the medical literature but it has become increasingly popular in recent decades. By reducing perceived stress and anxiety, yoga appears to modulate stress response systems. This, in turn decreases physiological arousal for example, reducing the heart rate, lowering blood pressure, easing respiration etc (Kirkwood *et al.,*2005)[12]. There is also evidence that yoga practices help increase heart rate variability, an indicator of the body's ability to respond to stress more flexibly (Ray, Kaplan and Jovanov, 1999)[13]. Additionally, it has been stated that stress from psychological, physically external and physically internal sources results in allostatic load, which can be reduced by yoga based practices that shift regulatory systems towards optimal homeostasis (Streeter *et al*., 2012)[14]. Hence, it was thought to undertake a study to develop a yoga module which will reduce examination anxiety and improve overall health in students.

1.2 Brief about Stress Hormones

Stress is the sum total of all mental and physical input over a given period of time. The marker used to measure stress is the adrenal steroid hormone, cortisol. Stress, whether physical or emotional in origin, provokes a response by the adrenal glands. Many hormonal imbalances are the direct result of adrenal insufficiency.

The adrenal glands produce two primary hormones, dehydroepiandrosterone (DHEA) and cortisol. Both are considered the major

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[12] G. Kirkwood, *et al*., "Yoga for anxiety: A systematic review of the research." British Journal of Sports Medicine, 39, 12, 2005, pp.884–891.

[13] G. C. Ray, A. Y. Kaplan, and E. Jovanov, "Homeostatic change in the genesis of ECG during yogic breathing." Journal of the Institution of Engineers (India), 79, 1, 1999, pp.28-33.

[14] C. C. Streeter, P. L. Gerbarg, R. B. Saper, D. A. Ciraulo, and R. P. Brown, "Effects of yoga on the autonomic nervous system, gamma-aminobutyric-acid, and allostasis in epilepsy, depression, and post-traumatic stress disorder." Medical Hypotheses, 78, 2012, pp.571-579.

shock absorber hormones in the body. They buffer stress and the negative impact it can have on both mental and physical function. Long-term stress can have a serious impact on the adrenal glands and cause them to shrink and reduce production. This causes cellular damage, which sets off a chain reaction affecting all parts of the body, as well as accelerating the aging process.

The symptoms associated with adrenal dysfunction are diverse and can involve the digestive, circulatory, respiratory, as well as the brain and nervous systems. In addition, the adrenals can impact the growth and repair of bones, muscles, hair and nails. Research has shown that to cause a positive hormonal change, you must first normalize adrenal activity.

Cortisol is a steroid hormone made in the adrenal glands. Cortisol's important function in the body includes roles in the regulation of blood pressure and cardiovascular function as well as regulation of the body's use of proteins, carbohydrates, and fats. Cortisol secretion increases in response to any stress in the body, whether physical or psychological pressures. When cortisol is secreted, it causes a breakdown of muscle protein, leading to release of amino acids into the bloodstream. These amino acids are then used by the liver to synthesize glucose for energy, in a process called gluconeogenesis. Cortisol also leads to the release of energy source from fat cells, for use by the muscles. Taken together, these energy directing processes prepare the individual to deal with stressors and insure that the brain receives adequate energy sources.

The body possesses an elaborate feedback system for controlling cortisol secretion and regulating the amount of cortisol in the bloodstream. The pituitary gland, a small gland at the base of the brain, makes and secretes a hormone known as adrenocorticotropic hormone, or ACTH. Secretion of ACTH signals the adrenal glands to increase cortisol production and secretion. The pituitary, in turn, receives signals from the hypothalamus

of the brain in the form of the hormone CRH, or corticotrophin-releasing hormone, which signals the pituitary to release ACTH. Almost immediately after a stressful event, the levels of the regulatory hormones ACTH and CRH increase, causing an immediate rise in cortisol levels. When cortisol is present in adequate or excess amounts, a negative feedback system operates on the pituitary gland and hypothalamus, which alerts these areas to reduce the output of ACTH and CRH, respectively, in order to reduce cortisol secretion when adequate levels are present.

DHEA (dehydroepiandrosterone) is the most abundant hormone found in the bloodstream. When the adrenal glands are chronically stressed, your production of DHEA can be greatly reduced. DHEA is an important regulator of the thyroid and pituitary glands. Though the adrenal glands produce most of the body's supply of DHEA, the gonads (ovaries, testes) can also manufacture DHEA when the adrenals are overworked. DHEA exerts powerful effects throughout the body. Most cells possess DHEA receptors on their membranes. DHEA is vital to health. DHEA also regulates many other hormones; however it can be easily converted to estradiol and/or testosterone and therefore needs to be monitored by testing levels of estradiol and testosterone. DHEA is a good stress barometer, because when stress levels go up, DHEA levels go down. Generally, DHEA levels tend to decrease with age.

1.3 Rationale of Yoga Intervention

Yoga is an ancient system of relaxation, exercise and healing with origins in Indian philosophy. Yoga has been described as "the union of mind, body, and spirit," which addresses physical, mental, intellectual, emotional and spiritual dimensions toward an overall harmonious state of being. Regular yoga practice creates mental clarity and calmness, increases body awareness, relieves *chronic stress patterns*, relaxes the *mind*, centers *attention* and sharpens *concentration*.

A large number of studies have shown that the practice of yoga can produce significant decrease in anxiety and stress scores (Jaynbakht *et al*., 2009; Kozasa *et al*., 2008; Michalsen *et al*., 2005; Woolery *et al*., 2004)[15, 16,17,18]. Previous studies indicate that yoga has got a potential role as a component in the management of depressive and anxiety disorders. The studies conducted so far reveal a beneficial role of yoga in not only causing reduction in excessive anxiety level but also attenuating the increase in anxiety score in stressful states such as examinations. Apparently, a decrease in anxiety scores in yoga practitioners leads to their better adjustment to the environmental and internal stressors. Therefore, they are able to perform their duties with calm disposition which improves their performance. Further, these observations suggest that even short term yoga program can lead to reduction in stress and anxiety in the individuals. In fact, Yoga strives to increase self-awareness on both a physical and psychological level. Given the positive impact of yoga practices on physical and psychological level researcher has introduced the program of yoga practices in students appearing for board examination.

1.4 Statement of the problem

Examinations are the bane of students. However, they have an important role in evaluating students' learning outcomes and their mastery of a subject. Passing or failing usually has strong consequences for one's career development, so examinations cause psychological stress in most students

[15] M. Javnbakht, R. Hejazi Kenari, and M. Ghasemi, "Effects of yoga on depression and anxiety of women." Complementary Therapies in Clinical Practice, 15, 2009, pp.102-104.

[16] E. H. Kozasa, R. F. Santos, A. D. Rueda, A. A. Benedito-Silva, F. L. De Ornellas, and J. R. Leite, "Evaluation of Siddha Samadhi yoga for anxiety and depression symptoms: a preliminary study." Psychological Reports, 103, 2008, pp.271-274.

[17] A. Michalsen, P. Grossman, A. Acil, J. Langhorst, R. Ludtke, T. Esch, G. B. Stefano, and G. Dobos, "Rapid stress reduction and anxiolysis among distressed women as a consequence of a three-month intensive yoga program." Medical Science Monitor, 11, 2005, pp.555-561.

[18] A. Woolery, H. Myers, B. Sternlieb, and L. Zeltzer, "A yoga intervention for young adults with elevated symptoms of depression." Alternative Therapies in Health and Medicine, 10, 2004, pp.60-63.

(Spangler, 1997)[19]. Academic examinations have been considered as one of the most acute stresses experienced by students (Deinzer *et al.,*2000; Jemmott and Magloire, 1997; Lacey *et al.,*2000; Lowe, Urquhart and Greenman, 2000; Maes *et al.,*1997; Maes *et al.,*1998)[20,21,22,23,24,25]. However, excessive anxiety is maladaptive and often considered to be a major component of unhealthy lifestyles and possibly contributes significantly to the pathogenesis of not only psychiatric but also systemic disorders such as cardiovascular disease, diabetes mellitus and bronchial asthma (Bijlani and Manchanda, 1981; Bruce *et al.,*1992; Paul *et al.,*2002)[26,27,28]. The psychological factors, including anxiety, contribute significantly not only to the pathogenesis of medical illness, but also affect their course and may be a

[19] G. Spangler, "Psychological and physiological responses during an exam and their relation to personality characteristics." Psychoneuroendocrinology, 22, 1997, pp.423-441.

[20] R. Deinzer, C. Kleineidam, R. Stiller-Winkler, H. Idel, and D. Bachg, "Prolonged reduction of salivary immunoglobulin A (sIgA) after a major academic exam." International Journal of Psychophysiology, 37, 2000, pp.219-232.

[21] J. B. Jemmott, and K. Magloire, "Academic stress, social support, and secretory immunoglobulin." A. J Pers Soc Psychol, 55, 1988, pp.803-810.

[22] K. Lacey, M. D. Zaharia, J. Griffiths, A. V. Ravindran, Z. Merali, and H. Anisman, "A prospective study of neuroendocrine and immune alterations associated with the stress of an oral academic examination among graduate students." Psychoneuroendocrinology, 25, 2000, pp.339-356.

[23] G. Lowe, J. Urquhart, and J. Greenman, "Academic stress and secretory immunoglobulin A." Psychol Rep, 87, 2000, 210-215.

[24] M. Maes, D. Hendriks, A. Gastel, P. Van, Demedts, A. Wauters, H. Neels, *et al*., "Effects of psychological stress on serum immunoglobulin, complement and acute phase protein concentrations in normal volunteers." Psychoneuroendocrinology, 22, 1997, pp.397-409.

[25] M. Maes, M. Planken, A. Van, Der., Gastel, K. Van, Bruyland, F. Hunsel, H. Van, Neels, *et al*., "Influence of academic examination stress on hematological measurements in subjectively healthy volunteers." Psychiatry Res, 80, 1998, pp.201-212.

[26] R. L. Bijlani, and S. K. Manchanda, "Stress as a diabetogenic factor." Indian J Physiol Pharmacol, 25, 1981, pp.184–188.

[27] D. G. Bruce, D. J. Chisholm, L. H. Storlien, E. W. Kraegen, and G. A. Smythe, "The effects of sympathetic nervous system activation and psychological stress on glucose metabolism and blood pressure in subjects with type2 (non-insulin-dependent) diabetes mellitus." Diabetologia, 35, 1992, pp.835–843.

[28] L. Paul, J. Feldman, N. Giardino, H. Song, and K. Schmaling, "Psychological aspects of asthma." J Consult Clin Psychol, 70, 3, 2002, pp.691–711.

target for effective intervention (Schattner, 2003)[29]. Furthermore, acute anxiety and stress has been reported to increase the activity of the hypothalamus-pituitary adrenal (HPA) axis with subsequent rise in cortisol level (Kirschbaum and Hellhammer, 1994)[30]. Mucosal immunity, as reflected by salivary immunoglobulin A (IgA) levels, (Mestecky, 1993)[31] is also influenced by psychological stress. With chronic stress, the production of immunoglobulin is suppressed, whereas acute psychological challenge increases IgA levels (Hucklebridge *et al.,* 2000)[32]. In fact, it is evident from past studies that stress leads to depression and, therefore, it becomes important to reduce the level of stress and anxiety as a part of prevention and management of stress / anxiety of examinations. Among the various approaches to reduce the level of anxiety, yoga is the one that combines the physical elements of a healthy lifestyle with prescriptions for abiding mental peace (Bijlani, 2003)[33]. It was, therefore, thought desirable to undertake this study entitled ***"Yoga for controlling hormonal activities in pre examination anxiety."***

1.5 The Problem and its relevance

Depression and anxiety are prevalent problems in students across the country. A student under certain stress does bring out his or her best, however extremes of stress and anxiety can result into *stress induced disorders* and deteriorating performance. Nevertheless, to cope up with stress

[29] A. Schattner, "The emotional dimension and the biological paradigm of illness: time for a change." Q J Med, 96, 2003, pp.617–621.

[30] C. Kirschbaum, and D. H. Hellhammer, "Salivary cortisol inpsychoneuroendocrine research: recent developments and applications." Psychoneuroendocrinology, 194, 1994, pp.313-333.

[31] J. Mestecky, "Saliva as a manifestation of a common mucosal immunity system." Ann N Y Acad Sci, 694, 1993, pp.184-194.

[32] F. Hucklebridge, S. Lambert, A. Clow, D. M. Warburton, P. D. Evan, and N. Sherwood, "Modulation of secretory immunoglobulin A in saliva: response to manipulation of mood." Biol Psychol, 53, 2000, pp.25-35.

[33] R. L. Bijlani, "Scientific medicine shows signs of a paradigm shift." New Approach Med Health, 11, 1, 2003, pp.28–40.

and anxiety among students several strategies are under study. In fact, numbers of scientific studies have reported the beneficial effects of yoga. Its historical, philosophical and psychotherapeutic aspects have also been dealt by several investigators (Nekl, 1975; Nekl, 1977; Rao, 1978; Varma, 1984)[34,35,36,37]. Yoga therapy and relaxation is found to be useful in neurotic and psychosomatic disorders (Balkrishna *et al.,* 1977; Benson *et al.,* 1974; Vahia *et al.,*1973a; Vahia *et al.,*1973b)[38,39,40,41]. Physiological effects of the yoga practices have also been widely studied (Selvamurthy *et al.,* 1983)[42] and one study has reported the usefulness of systematic desensitization in examination phobia (Shukla and Nigam, 1979)[43].

Many studies support yoga's benefits beyond introspection and meditation. Engagement in yoga has been shown to improve mental disorders, such as depression and anxiety (Javnbakht, Kenari, and Ghasemi,

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[34] J. S. Nekl, "Psychotherapy in India: past, present and future." American Journal of Psychotherapy, 29, 1975, pp.92-100.

[35] J. S. Nekl, "Psychotherapy in India." Indian Journal of Psychiatry, 19, 2, 1977, pp.1-10.

[36] V. A. Rao, "Presidential address: Psychiatric thoughts in ancient India." Indian Journal of Psychiatry, 20, 1978, pp.107-119.

[37] L. P. Varma, "Yoga, meditation and mysticism. In : Psychiatry in India, (Eds.) De Sousa, A. and De Suasa, DA., 1984, pp 21-52, Bombay : Bhalani Book Depot.

[38] V. Balkrishna, L. D. Sanghvl, K. Rana, D. R. Doongaji, and N. S. Vahia, "The comparison of the psychophysiological therapy with drug therapy." Indian Journal of Psychiatry, 19, 2, 1977, pp.87-91.

[39] H. Benson, B. A. Ronner, B. R. Marzetta, and H. M. Klemchuk, "Decreased blood pressure in pharmacologically treated hypertensive patients who regularly elicited the relaxation response." Lancer, 1, 1974, pp.289-291.

[40] N. S. Vahia, D. R. Doongaji, D. V. Jeste, S. N. Kapoor, I. Aradhapurkar, and N. S. Ravindra, "Psychophysiological therapy based on the concepts of Patanjali-a new approach to the treatment of neurotic and psychosomatic disorders." American Journal of Psychotherapy, 27, 1973a, pp.557-565.

[41] N. S. Vahia, D. R. Doongaji, D. V. Jeste, S. N. Kapoor, I. Ardhapurkar, and N. S. Ravindra, "Further experience with therapy based upon the concept of Patanjali's in the treatment of psychiatric disorders." Indian Journal of Psychiatry, 15, 1, 1973b, pp.32-40.

[42] W. Selvamurthy, H. S. Nayar, N. T. Joseph, and S. Joseph, "Physiological effects of yogic practice." NIMHANS Journal, 1, 1983, pp.71-80.

[43] G. D. Shukla, and P. Nigam, "Systematic desensitization therapy in examination phobia." Journal of Association of Physicians of India, 27, 1979, pp.725-730.

2009)[44]. Cortisol, DHEAS and GABA levels are markers of stress (Streeter *et al*., 2009; Pike *et al*., 1997)[45,46]. Elevated cortisol levels are found in depression that indicates increased HPA axis activity (Bremner *et al*., 1997; von Bardeleben *et al*., 1988)[47,48]. Nevertheless, decreased cortisol and increase in GABA levels have been reported after intervention of yoga postures and meditation (Jevning *et al*., 1978; Kamei *et al*., 2000)[49,50].

Thus, it seems that the practice of yoga or relaxation may be very useful in controlling the mind and keeping it in a state of peace and tranquility, even under the stressful situations and therefore perhaps helps an individual to adequately cope with the competitive environment. Students are usually under stress due to a variety of reasons like vast curriculum, academic competition, examinations etc. During these stressful situations there is a possibility to increase in anxiety level and sympathetic discharge. This may, in turn, interfere with their performance and make them more prone to develop psychosomatic problems prior to the examination. This might led to think that regular practice of yoga and relaxation may be useful in attenuating the

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[44] M. Javnbakht, R. Hejazi Kenari, and M. Ghasemi, "Effects of yoga on depression and anxiety of women." Complementary Therapies in Clinical Practice, 15, 2009, pp.102-104.

[45] C. C. Streeter, T. H. Whitfield, R. B. Saper, E. Owen, M. Gensier, N. Turnquist *et al*., "The effect of yoga and walking on brain GABA levels." San Faranscisco, CA, American Psychiatric Association Annual Meeting, 2009.

[46] J. L. Pike, T. L. Smith, R. L. Hauger, P. M. Nicassio, T. L. Patterson, J. McClintick *et al*., "Chronic life stress alters sympathetic, neuroendocrine, and immune responsivity to an acute psychological stressor in humans." Psychosomatic Medicine, 59, 1997, pp.447-457.

[47] J. D. Bremner, J. Licinio, A. Darnell, J. H. Krystal, M. J. Owens, S. M. Southwick, *et al*., "Elevated CSF corticotrophin-releasing factor concentration in posttraumatic stress disorder." American Journal of Psychiatry, 154, 1997, pp.624-629.

[48] U. Von Bardeleben, and F. Holsboer, "Human corticotrophin releasing hormone clinical studies in patients with affective disorders, alcoholism, panic disorder and in normal controls." Prog Neuropsychopharmocl Biol Psychiatry, 12, 1988, pp.165-187.

[49] R. Jevning, A. F. Wilson, and J. M. Davidson, "Adrenocortical activity during meditation." Hormones and Behavior, 10, 1978, pp.54-60.

[50] T. Kamei, Y. Toriumi, H. Kimura, S. Ohno, H. Kumano, and K. Kimura, "Decrease in serum cortisol during yoga exercise is correlated with alpha wave activation." Perceptual Motor Skills, 90, 2000, pp.1027-1032.

increase in anxiety level and sympathetic discharge in students. This, in turn, may improve their academic performance and make them less vulnerable to psychosomatic problems. Perceiving these aspects, the present study has been undertaken.

1.6 Objectives of the Study

Although number of studies demonstrated ill effects of pre-examination anxiety in students, very few studies are conducted so far in evaluating hormonal imbalance. Hence, the objectives of this study are:

- To assess the pre-examination anxiety and associated psycho-physiological as well as stress mediated hormonal attributes of the students appearing in State level Board examination.
- To develop a yoga programme with a view to reduce pre-examination anxiety and restoring hormonal balance.
- To see the effect of the yoga programme on pre-examination anxiety and the selected attributes.

1.7 Hypotheses

After an extensive review the researcher has formulated following hypotheses:

HO_1: Yoga training would not help to control pre-examination anxiety and associated psychological variables and thereby may not restore relaxation as well as concentration.

HO_2: Yoga training would not be effective in reinstating hormonal balance in students appearing for final examination.

HO_3: Yoga training would not be effective in reinstating physiological homeostasis in students appearing in the state level Board examination.

1.8 Delimitation of the Study

As this study has been conducted in Nainital District, Uttarakhand, the researcher delimited the study in following ways:

- This study has been delimited to the students of Government High School, Naisela, P.O. Bel, Via Patwadanger, Block Bheemtal, Dist. Nainital.
- Selected traditional yoga practices have been confined in this study as found suitable.
- The students, age group of 16-17 years, who are appearing for the state level Board Examination, have been considered.

1.9 Scope and Limitations of the Study

This study has large scope in student community because they face various competitive examinations and are prone to develop stress and anxiety which had ill effect on physical and mental health. Therefore, the outcome of this study may be generalized for all student and professionals. Moreover, this study has a scope for the patients with anxiety disorders.

In this study the participants were student aged 16 to 17 years and, therefore, its result may not be implemented for the students of other age group. This study was conducted on a small sample of the students of a single school; however, large data is required to reconfirm the result of this present study.

1.10 Operational Definition of Terms used

Yoga

Yoga is a system that benefits the body, mind and spirit by teaching self-control. It is a series of postures and practices through breathing, relaxation and concentration.

Yoga is an efficient method of toning muscles and vital organs and is the ideal method of ensuring good health and Fitness. It brings a state of homeostasis, which leads towards a well-balanced personality. The major techniques of Hathayoga are Asanas (Body postures), Pranayama (Breath Control), Bandha (Physiological Locks), Kriyas (Cleansing Process) and Mudra (Gestures).

The ultimate goal of yoga is self-realization so that each individual can attain his or her complete physical, emotional, mental and spiritual potential.

Hormonal Imbalance

A hormone imbalance is when there is too little or too much of a particular hormone in one's body. Hormones are the chemical messengers in the body that travel the bloodstream to the organs and tissues. They slowly work and affect many of the body's processes over time. Endocrine glands, which are special groups of cells, make hormones.

Examination Anxiety

Examination anxiety is a common phenomenon negatively affecting the academic, emotional, personal and social lives of almost 20% students across nationalities including India. Test anxious students score poor grades/marks and have poor mental health in comparison to others. It may be fatal at times. There are reports of deliberate self-harm and suicide by students highlighting the need for timely intervention.

Academic Stress

Academic stress refers to the pressure to perform well in final school examinations and competitive college entrance examinations that is experienced by 10th and 12th standard students. For some students, the experience of academic stress leads to a sense of distress, which is generally manifested in a variety of psychological and behavioural problems.

1.11 Significance of the Study

- The yoga training may probably help in reducing anxiety, depression and stress levels thereby decreasing chance of developing anxiety disorders among student facing examinations.
- Yoga can be used as an alternative therapy to restore hormonal imbalance especially stress hormones caused by pre-examination anxiety in students appearing for State level Board Examination.
- This experiment would enrich literature as well as education. Moreover, other researchers of medical science and allied disciplines may get an added idea regarding inclusion of yoga in the treatment procedure.
- Yoga can be used as an adjuvant therapy for overcoming pre-examination anxiety and associated stress related disorders.