

**“LAUGHTER THERAPY”-THE “MASTERKEY TO COMBAT STRESS”, ITS IMPACT ON THE BIOMARKER-CORTISOL, AMONG STUDENTS****Dr. Gayathri Dilliraj\*<sup>1</sup> and Dr. B. Shanthi<sup>2</sup>**<sup>1</sup>Department of Biochemistry, Sree Balaji Medical College & Hospital, Chrompet, Chennai 44.<sup>2</sup>H.O.D & Professor, Department of Biochemistry, Sree Balaji Medical College & Hospital, Chrompet, Chennai 44.**\*Corresponding Author: Dr. Gayathri Dilliraj**

Department of Biochemistry, Sree Balaji Medical College &amp; Hospital, Chrompet, Chennai 44.

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**ABSTRACT**

**Introduction:** “Stress” the potent psychological factor & its impact on the human body, is one of the widely researched areas of interest, globally. Students in particular experience stress at various levels in diverse stages of their lives due to a number of reasons such as a new life environment, lifestyle, health, academic performances, completion, choice of career, relationship with peer groups & expectations of parents etc. Laughter is a human behaviour which is executed chiefly by the brain & laughter therapy has been accepted as a complementary & alternative treatment approach for both mental and physical health issues. Its usage has rapidly become widespread. Among the various known biomarkers of stress, one of the best ways to measure reactivity of the hypothalamic pituitary adrenal axis, is to measure the easy to obtain and highly reliable biomarker cortisol. **Aim:** To establish the health benefits of “Laughter therapy to combat stress” amidst students & its impact on cortisol levels. **Methods:** It is a simple hospital based correlative study carried out in S.B.M.C.H students. The purpose of which was to analyse the role of laughter therapy to combat stress amidst students. The subjects were 150 moderately stressed out students of 17-19yrs of age, consisting of 80 boys and 70 girls with no other known health complications. Their stress levels was estimated using the perceived stress score scale. The study was conducted just one month prior to their semester exams (when they were comparatively, more stressed out). We engaged them in 30 minutes of laughter therapy (stimulated laughter) /day regularly for 6 days a week for a period of 4 weeks. We measured their serum cortisol levels both before & after the four weeks of regular laughter therapy practise, by ELISA. **Results:** Students with moderate levels of stress comparatively had high normal range of serum cortisol levels, prior to the initiation of laughter therapy. Following the regular practise of laughter therapy for 4 weeks their cortisol levels demonstrated significant decrease. Their perceived stress score levels decreased as well. **Conclusion:** As cortisol is a very good indicator of stress. The significant decrease in its levels suggests, that laughter therapy can be used as the simplest cost effective non pharmacological intervention to combat this global threat called stress. Besides it, students also claimed to have attained a general sense of well being, increased concentrating abilities, a sound sleep with a relaxed state of mind following the regular practise of laughter therapy.

**KEYWORDS:** Stress, Laughter therapy, Serum cortisol levels.**INTRODUCTION**

Stress can be defined as a state of mental/emotional strain or tension resulting from adverse/demanding circumstances. The world health organization (WHO) has declared stress to be a “world wide epidemic”, based on various statistical studies done globally. In today's 21<sup>st</sup> century the world is becoming highly competitive, where it is all about the survival of the fittest, along with the unending & unlimited needs & wants of people associated with the drive & the greed to be more successful than others. All these factors have culminated to form an excessively stressed out society for today's generation.

Stress is a growing problem not only in India but all over the globe, among all age groups. Census shows that suicide rates are high amidst (15-29yrs) teenagers and early adulthood groups in India.<sup>[1]</sup> A 2017 survey conducted in India concluded that every day, 6.23 students commit suicide due to the peer pressure.<sup>[2]</sup>

Stress is a top health concern for teens globally. Psychologists emphasize the need to establish healthy ways to manage the growing stress at the earliest, as it tends to have serious complex long-term health implications affecting the various systems in the body if left unchecked.

Stress in general increases the sympathetic stimulation that causes increased cortisol levels that provides the body with excess glucose needed, by gluconeogenesis in the liver, by using protein stores as the alternative source of energy. This energy serves the individuals flight/flee in response to a stressor.<sup>[3]</sup> Few of the various proved, longterm, complex health hazards of prolonged stress in the body are:

- Hair: excessive loss & baldness
- Brain: headaches, insomnia, irritability, anxiety & depression
- Mouth: oral ulcers & excessive dryness
- Heart: cardiovascular diseases & hypertension
- Digestive tract: diseases of the digestive tract including gastritis stomach ulcers & irritable colon.
- Respiratory system: menstrual disorders & recurrent vaginal infections in women. Impotence & premature ejaculation in men.
- Skin: outbreak of skin problems like eczema & psoriasis.
- Bone: inhibits the bone building osteoblasts, osteoporosis
- Various types of cancers like cancer stomach (on prolonged exposure to excessive stress) etc.<sup>[4]</sup>

There are various laboratically detectable markers available for measuring the stress levels such as – cortisol (in serum, saliva, hair or finger nails), salivary alpha amylase, HR & BP variability, blood levels of vasopressin, inflammatory markers like C-reactive proteins, immunoglobulins.<sup>[5]</sup> etc.

### AIM

To establish the significant health benefits of “Laughter therapy to combat stress” amidst students, its impact on serum cortisol levels. Laughter therapy is a practise involving prolonged voluntary laughter. The sessions starts with gentle warm up stretches followed by chanting, clapping, eye contact & body movements, to help break down inhibitions and encourage a sense of playfulness. 20 minutes of laughter is said to be sufficient to develop full physiological benefits.<sup>[6]</sup> It has been accepted as a complementary & alternate approach for both physical & mental health in the global scale.

### MATERIALS & METHODS

It is a simple hospital based correlative study carried out in S.B.M.C.H students. The purpose of which was to analyse the “role of laughter therapy to combat stress” amidst students. The subjects were 150 Allied health sciences (AHS) student volunteers of 17-19 yrs of age, without any known medical complications, drugs, etc. All the students were counselled and motivated and their consent was obtained prior to the study. Their stress levels was estimated using the Perceived Stress Score Scale.

The perceived stress scale is a standard simplest tool for assessing the stress levels developed in 1983. It helps us to assess how our emotions and perceived stress, alter according to our perception of our situation, during the last month. It consists of a series of 10 simple, questionnaires with five options to choose from for each question (0=never, 1=almost never, 2=sometimes, 3=fairly often, 4=very often). Based on their replies they can score in the range of 0-40.

- Low level stress: score 0-13
- Moderately stressed: 14-26
- High perceived stress: 27-40.<sup>[7]</sup>

## Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

Name \_\_\_\_\_ Date \_\_\_\_\_

Age \_\_\_\_\_ Gender (Circle): M F Other \_\_\_\_\_

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly? ..... 0 1 2 3 4
2. In the last month, how often have you felt that you were unable to control the important things in your life? ..... 0 1 2 3 4
3. In the last month, how often have you felt nervous and "stressed"? ..... 0 1 2 3 4
4. In the last month, how often have you felt confident about your ability to handle your personal problems? ..... 0 1 2 3 4
5. In the last month, how often have you felt that things were going your way? ..... 0 1 2 3 4
6. In the last month, how often have you found that you could not cope with all the things that you had to do? ..... 0 1 2 3 4
7. In the last month, how often have you been able to control irritations in your life? ..... 0 1 2 3 4
8. In the last month, how often have you felt that you were on top of things?.. 0 1 2 3 4
9. In the last month, how often have you been angered because of things that were outside of your control?..... 0 1 2 3 4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? ..... 0 1 2 3 4

**Exclusion criteria:** Absence of cushings syndrome, family history of any endocrinal, psychiatric or gynocological probles, drugs.

**Duration of study:** The study was conducted during the month of November 2018 (i.e just one month prior to their first semester exams in december, when they were comparitevely, more stressed out owing to the exam tension).<sup>[8]</sup> We engaged them in 30 minutes of laughter therapy(stimulated laughter)/day regularly for 6 days a week for a period of 4 weeks under the guidance of an experienced laughter therapist, who volunteered to guide the students for a month in order to promote social awareness about laughter therapy. Laughter therapy chiefly consists of 5-10 minutes of simple warm upstretches, clapping and chatting followed by 20 minutes of stimulated laughter, that consists of laugh to your breathing process then child likeplayfulness, where they make funny poses or gestures and laugh at each other and lastly they follow a series of laughter exercises (such as laughing and shaking hands, namaskar with laugh, cross hand holding with laugh and so on).<sup>[6]</sup>

We measured their serum cortisol levels and perceived stress scale scores both before & after the four weeks of regular laughter therapy practise, by ELISA in the central laboratory of Sree balaji medical college and hospital chrompet in nmol/lit. Using the cortisol elisa kit-ab

108665. Inorder to avoid diurnal variation induced changes in the serum cortisol levels, on both the occasions, the blood sample for serum cortisol was collected around the same timings in the morning. The normal serum cortisol reference levels from 8.am to noon is 138-690 nmol/L(5-25mcg/dL).<sup>[4]</sup>

**Statistical analysis:-**Data entry was done in MS excel sheet. Software package for the social sciences version Spss 18 was used to perform statistical analysis.

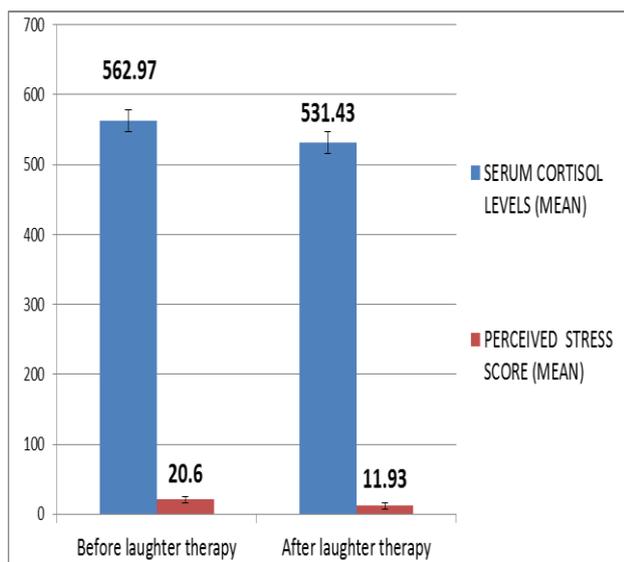
## RESULTS

**Table 1: Comparison of mean Serum cortisol Levels before and after laughter therapy.**

Serum Cortisol	N	Mean	S.D
Before laughter therapy	150	562.9707	21.42
After laughter therapy	150	531.4367	21.0063

**Table 2: Comparison of their mean perceived stress scale scores before and after laughter therapy.**

Perceived Stress Score	N	Mean	S.D
Before laughter therapy	150	20.60	3.84
After laughter therapy	150	11.93	3.27



**Figure 1: Comparison of mean serum cortisol levels & perceived stress scale scores before and after one month of laughter therapy.**

## DISCUSSION

Student volunteers had moderate levels of stress (estimated using the perceived stress scale scores), they had comparatively higher normal range of cortisol levels prior to the initiation of laughter therapy. Among the 150 student volunteers following the regular practise of laughter therapy for 4 weeks 110 subjects (i.e. 73%) showed marked decrease in their serum cortisol levels and 120 subjects (i.e. 80%) showed decrease in their stress scores as well, with a very significant calculated probability 'p' value, of 0.001 (a value <0.05 is statistically significant) and also showed a positive correlation between the variables. There was no sexual predilection (i.e both boys and girls showed significant changes).

Besides it, students also claimed to have attained a general sense of well being, increased concentrating abilities, a sound sleep with a relaxed state of mind following the regular practise of laughter therapy. It was further proved by their improved academic performance, as most the 150 students, most of whom were below average performance students academically, even managed to pass their semester exams held after a month, which they fully credited to their increased concentrating abilities, sound sleep with a stress free, relaxed state of mind achieved by regularly following laughter therapy.

Among the various parameters used to measure stress laboratorically, cortisol is one of the easily measurable and precise index used(in the absence of other complications that could alter the cortisol levels such as polycystic ovarian disease, cushings syndrome, hyperthyroidism etc). Various common stress scales used globally are- Holmes & Rahe stress scale(1967), Run training stress

score, Perceived stress scale scores(simplest easily measurable)<sup>[9]</sup> etc.

Various forms of laughter therapy are followed in different parts of the world.

Though their methods of execution/implementation may vary depending on the locality & the condition (such as persons with stroke/bedridden persons/fracture limbs/healthy persons etc) or the age group of the subjects involved. It basically consists of four components:

- Simple warm up stretches along with some clapping and chatting(to avoid inhibitions),
- Laughing to your breathing,
- Child like playfulness(by making funny gestures, playing funny games etc)
- Followed by laughter exercises.

The same if done with more of breathing exercises for a little prolonged period of time under proper guidance can also be termed as laughter yoga, which is also being followed in a large scale globally. Regular practise of 20 minutes of laughter therapy every day is said to be sufficient to produce significant health benefits. Some of the other health benefits of laughter therapy are:

- Reduces heart rate(as it increases pumping & circulation, slows down the pulse, strengthens the heart overall)
- Natural pain killer (triggers endorphins release, i.e bodys natural feel good chemical that promotes an overall sense of well being & even temporarily relieves pain. It also releases neurotransmitters that has effects, similar to morphine which is responsible for euphoric effect)
- Improves breathing (enhances the movement of the diaphragm, causes us to have deep breaths so enhances easy gas exchange)
- Helps us loose weight(workout to tone the abs as abdominal muscles expand & contract)
- Gives good sleep(by reducing muscle tension)
- Decreases stress hormones(better immune performance)
- Makes us look young (by enhancing circulation)
- Boosts T cells (activates T cells).<sup>[10]</sup> etc.

## CONCLUSION

From this study it was concluded that, regular practice of laughter therapy does have beneficial health consequences by decreasing the stress levels, the serum cortisol levels. We have also started a wats up group called "Laugh out loudly" where many students and faculty members actively share funny videos, funny quotes or their funny life experiences on a day to day basis, to self motivate each other and to keep ourselves stress free, happy, positive and connected throughout the day.

Laughter serves as an internal, simple workout by exercising the abs (contraction occurs) & makes the heart healthy and stronger. The various negative emotions like stress, anxiety, anger, guilt are being replaced by more positive emotions like joy, delight and excitement.<sup>[11]</sup> It gives us a more light hearted perspective that makes us consider challenges and difficulties as yet another learning experience. It makes us approach hurdles in an optimistic way. Laughter also serves as a good means of connectivity with people, it spreads positivity. Laughter enhances the zest of life by improving our overall resilience.

Thereby proving that long term regular laughter practice could have multiple health benefits which could serve as a masterkey to combat not only stress but various other health problems. Thus by using this simple study results as a vital tool, additional detailed long term studies involving larger, diverse study groups and further research are still needed to accurately evaluate the other hidden, potential health benefits of laughter therapy, which could hence it also can be termed as the-“The iceberg phenomenon of laughter therapy”.<sup>[12]</sup> Laughter is timeless, laughter is contagious & it is the cheapest medicine available. So lets laugh our way to health & happiness.

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