Ancient Science of Life, Vol No. VI No. 2 October 1986, Pages 112 - 118

# MENTAL DEPRESSION AND KUNDALINI YOGA

**SANJENBAM KUNJESHWORI DEVI, J. P. N. CHANSAURIA AND K.N. UDUPA**

*Centre for Experimental Medicine and Surgery, Institute of Medical Sciences, Banaras Hindu University, Varanasi – 221 005, India.*

**Received: 20 May 1986** **Accepted: 28 June, 1986**

***ABSTRACT:*** *In cases of mental depression, the plasma serotonin, melatonin and glutamate levels are increased along with the lowering of urinary – 5 – hydroxyindole acetic acid, plasma monoamine oxidase and cortisol levels following three and six months Practice of Kundalini Yoga. The pulse rate and blood pressure in these patients are also lowered after Kundalini Yoga practice. Thus, the practice of Kundalini Yoga helps to maintain a perfect homeostasis by bringing an equilibrium between the sympathetic and parasympathetic activities and it can be used as a non – medical measure in treating patients with mental depression.*

## INTRODUCTION

Most depressive patients suffer from one or more hormonal abnormalities[1]. There strong links between hormone production and the activity of catecholamines and other synaptic transmitters in the brain[2]. Some depressed persons respond best to drugs that affect catecholamines more than serotonin, and others respond best to drugs that effect mostly serotonin[3]. Thus, it appears that biochemically there are several different forms of depression, including one with low catecholamines, and, other with low serotonin. Some workers have also suggested that depression, is caused due to excess of receptors of these transmitters[4,5]. Individuals with major depressive disorder were found to have a significantly higher cortisol and lower melatonin level than the normal subjects[6].

Antidepressant drugs are effective in about two – third of all seriously depressed patients after a delay of two to three weeks. These drugs have some unpleasant side effects, including dry mouth, blurred vision, urinary retention, habit forming and sometimes impotence etc. In other words, antidepressant drugs can be beneficial, but there is room for improvement[8].

In recent years there has been an intense search for some promotive or preventive or curative non – medical measures for the management of the mental health problems. Our ancient philosophers, sages and spiritual leaders have also described methods for maintaining tranquility of mind. Amongst them Yogic Practices with particular reference to Kundalini Yoga seem to be the earliest and most effective method for providing peace and tranquility of mind. It has also been mentioned that the persons regularly practicing Kundalini Yoga are relatively less prone to develop psychosomatic imbalances when exposed to external and internal stimuli resulting from stress and strain of life[8].

In the present study, the circulating levels of serotonin, δ – aminobutyric acid, glutamate, melatonin, cortisol and related enzyme (like monoamine, oxidase) and urinary 5 – hydroxyindole acetic acid have been determined before and after practice of …..

## MATERIALS AND METHODS

The present study included 80 clinically diagnosed cases of mental depression and 30 normal healthy volunteers. All the patients were selected from the Psychiatru – Out – Patient Department, S. S. Hospital, Institute of Medical Sciences, Banaras Hindu University. None of these cases exhibited any manic symptoms. The patients and the normal healthy volunteers were all male and their age ranged between 20 and 40 years. Twenty four hours urine sample from patients and normal ……

The patients were explained the nature and other details of the study and they agreed to submit themselves to this investigation. There after, the patients were divided into the following groups:

Group I (Kundalini Yoga Therapy): This group comprised of 40 patients. They were advised to practice Kundalini Yoga as per the method given below under the supervision of a well – trained Yoga teacher. Follow – up study of the biochemical and physiological parameters was carried out at the end of 3 and 6 months practice of Kundalini Yoga.

Group II (Drug treated) : This group included 40 patients who were given tricyclic antidepressant (imipramine) orally in the doses of 25 mg three times a day as prescribed by the physician. Similar to group I, the biochemical and physiological parameters were recorded at the end of 3 and 6 months of treatment.

The subjective improvements in these patients of different groups were also recorded verbally and from their outward appearance at the end of 6 months.

The data was statistically analyzed using the Student's "t" test. The pre treatment values compared with the control values whereas after treatment values were compared with the pre – treatment values.

### Method of Kundalini Yoga

Kundalini Yoga was practiced in the morning between 8 and 9 A.M. before taking breakfast. The practice lasted for one hour per day in a clean and well – ventilated room of the Yoga Research Laboratory, B. H. U. under an expert's supervision. The method of Kundalini Yoga includes certain Yogic procedures i.e. Asanas, Pranayamas and concentration at various Chakras which is as follows: (1) *Asana :*

i) *Savasana* (5 min) : In this Asana, one lies down on the floor with arms at the sides, palms facing upwards and feet slightly apart to a comfortable position. Thereafter, the volunteer is adviced to close his eyes, relax the whole body, breath in a rhythmic and natural way by counting the breaths – 1 in, 1 out, 2 in – 2 out and so on, and finally controls his thoughts and emotions and relaxes his mind.

ii) *Sarvagasana* (1 min) : The volunteer lies flat on the back and raises the legs and back until he stands on the shoulders. The chin is kept against the chest and the legs are kept vertical. This posture is done for one minute.

iii) *Matsyasana* (1 min) : This Asana is performed in lying down position by starting with the sitting position with legs folded. After this, the person lies down on the ground in such a way that only the head and buttocks touch the ground and the back remains in the form of arch. Thereafter, with the hands one touches the toes and takes a regular deep breathing in this posture for one minute.

iv) *Paschimotanasana* (1 min) : The person lies down flat on the ground and then raises his upper part of the body gradually in such a way that it touches the outstretched legs, without bending at the knees and the face is kept between the knees.

v) *Halasana* (1 min) : In this posture, at first the person lies on the back, raises the legs and back and then swings over the legs in such a way that toes of his legs touch the ground over his head. The arms remain straight along the ground. During this procedure knees and legs are kept straight and tight.

vi) *Bhujangasana* (1 min) : In this Asana, the person lies down on the floor with face down or prone position. Then he lifts his upper half of the body above the navel by supporting it with outstretched hand, forearm and arm. Then he throws back and stretches the head, neck and trunk in such a way that the posture looks like a serpent in rage. This posture is maintained for one minute.

vii) *Salabhasana* (1 min) Here, the person lies on the prone or face down position and tries to lift his legs up without bending the knee. At the same time, the upper part of the body including the chin is on the ground and the arms are kept extended by the side of the body to give full support to the body weight. Then, one tries to raise the head and shoulders and throws them backwards as much as possible by extending the neck.

viii) *Padmasana* (1 min): In this Asana, one sits with the legs extended forward. Bends one leg, placing the foot on the top of the other thigh with the sole upward and the heel touching the pelvic bond. Then he folds the other leg so that the foot rests in a similar position on the opposite thigh.

**1. Pranayama and Cocentration at various Chakras :**

i) After doing the Asanas, one sits in a comfortable posture sukhasana or lotus posture (padmasana) and closes his eyes. Thereafter, the volunteer is advised to :

- Perform Pranayama. The practitioner takes a deep expiration, closes one nostril with middle finger, takes a deep inspiration for 4 seconds, holds it for 16 seconds and expires the air in 8 seconds. At the same ration, the practitioner repeats the performance, through the other nostril by closing the first one by the thumb alternately. Like this one carry on Pranayama for 10 times slowly and steadily.

- Takes his mind and fixes it at the *Muladhara Chakra* for two min.

- Similarly, takes up his mind to a circle around and inside the *Swadhisthan Chakra* for another two minutes.

- Taking the mind and allow it to concentrate at the *Manipura Chakra* for two minutes.

- After Anahata Chakra, takes the mind upwards and fix – up it for two minutes at the *Vishudha Chakra.*

- Takes up his mind to the *Sahasrara Chakra* (cerebral cortex) for two minutes.

- Perform Pranayama 10 times.

- This is followed by concentration on various Chakras for a similar period on a reverse order.

- Pranayama is again repeated in the same way for 10 times.

- Lastly, the volunteer is asked to perform *Savasana* for 5 min, as mentioned above.

**RESULTS**

*General Observations:*

After six months practice of Kundalini Yoga, 60% of the depressive patients showed improvement in their sleep patterns, digestive system, social interactions and became less irritable. However, in cases treated with imipramine, these subjective improvements were less prominent.

**Physiological Observations:**

In depressive patients the pulse rate and blood pressure were found to be significantly increased than the normal (Table – I). After 3 and 6 months practice of Kundalini Yoga, this pulse rate and blood pressure were significantly lowered in comparison to pre-treatment level (Table – I). Similar changes in pulse rate or blood pressure were also observed at the following 3 and 6 months treatment with imipramine (Table – I).

**TABLE – I**

**Pulse rate, Systolic and diastolic blood pressure changes before and after treatment with Kundalini Yoga and drug in *Depressive patients* (Values are Mean ± SEM)**

| Parameter | Control (30) | Pre-Therapy (80) | Kundalini Yoga therapy (40) | | Drug therapy (40) | |
|---|---|---|---|---|---|---|
| | | | 3 months | 6 months | 3 months | 6 months |
| Pulse rate per minute | 80.00 ± 2.0 | 99.00* ± 2.1 | 90.50**** ± 1.5 | 86.00**** ± 1.2 | 88.00**** ± 1.5 | 85.00**** ± 2.0 |
| Systolic blood pressure (mm Hg) | 115 ± 5.0 | 128.00*** ± 1.2 | 123.00* ± 1.0 | 120.40*** ± 2.5 | 120.00**** ± 2.0 | 117.00**** ± 2.0 |
| Diastolic blood pressure (mm Hg) | 75.00 ± 5.8 | 90.00** ± 2.1 | 82.00*** ± 1.2 | 80.60**** ± 2.5 | 83.00*** ± 2.0 | 81.00**** ± 1.5 |

Figures in parentheses indicate the number of cases; SEM – Standard Error of Mean
P*ے.05; P** ے.02; P*** ے.01; P**** ے.001

**TABLE – II**

**Plasma Serotonin, γ – aminobutyric acid, glutamate, melatonin, cortisol, monoamine – oxidase and urinary 5 – hydroxyindole acetic acid levels as a function of duration of Kundalini Yoga practice and Chemotherapy in *Depressive patients.***
**(Values are Mean ± SEM)**

| Parameter | Control (30) | Pre-Therapy (80) | Kundalini Yoga therapy (40) | | Drug therapy (40) | |
|---|---|---|---|---|---|---|
| | | | 3 months | 6 months | 3 months | 6 months |
| Serotonin (ng / ml) | 101.50 ± 6.0 | 69.50 **** ± 5.0 | 86.50* ±5.5 | 92.40**** ± 4.0 | 89.50 **** ± 5.0 | 94.00*** ± 6.2 |
| γ – aminobutyric acid (µmoles / ml) | 0.590 ± 0.03 | 0.529 ± 0.05 | 0.532 ± 0.05 | 0.533 ± 0.04 | 0.531 ± 0.05 | 0.545 ± 0.06 |
| Glutamate (µmoles / ml) | 0.591 ±0.03 | 0.325**** ± 0.01 | 0.365 ±0.02 | 0.455**** ± 0.03 | 0.423 *** ± 0.03 | 0.492**** ±0.03 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Melatonin (ng/ml) | 0.76 ± 0.09 | 0.54** ±0.02 | 0.65*** ±0.03 | 0.68**** ±0.03 | 0.65*** ±0.03 | 0.66**** ±0.02 |
| Cortisol (µg%) | 19.00 ±1.9 | 28.00**** ±1.5 | 22.80* ± 2.0 | 21.00*** ±2.1 | 21.50*** ±2.1 | 20.40*** ±1.7 |
| Monoamine oxidase (PU/ml) | 11.56 ±0.68 | 15.01**** ±0.7 | 13.51* ±0.3 | 12.21*** ±0.7 | 12.61*** ±0.6 | 11.92*** ±0.75 |
| Urinary 5 – hydroxyl indole acetic acid (µg/g of creatinine) | 3.15 ±0.34 | 4.71 *** ±0.35 | 3.95* ±0.14 | 3.67* ±0.40 | 3.88* ±0.15 | 3.75* ±0.35 |

Figures in parentheses indicate the number of cases;
P*ے.05; P** ے.02; P*** ے.01; P**** ے.001

**Biochemical Observations:**

Table – 2 shows the biochemical changes in mental depression and after 3 and 6 months treatment i) with Kundalini Yoga and ii) with imipramine

In patients of mental depression the circulating levels of serotonin, glutamine and melatonin were found to be decreased significantly as compared to normal. At the end of 3 and 6 months practice of Kundalini Yoga, the plasma serotonin and melatonin levels increased significantly from the pre-treatment values. However, the increase in plasma glutamate level was found to be significant only at the end of six months practice of Kundalini Yoga. Similarly, in patients treated with drug alone plasma serotonin, melatonin and glutamate levels were recorded to be significantly increased after 3 and 6 months.

The patients of mental depression exhibited higher plasma cortisol, monoamine oxidase and urinary – 5 – hydroxyindole acetic acid levels than normal. These levels decreased significantly from their pre-treatment values after 3 and 6 months practice of Kundalini Yoga. The treatment with imipramine also decreased the plasma cortisol, monoaminic oxidase and urinary 5 – hydroxyindole acetic acid levels significantly from their pre – treatment values within 3 and 6 months durations.

Unlike the above parameters, in mental depression patients plasma δ-aminobutyric acid level was found to be within normal range. After Kundalini Yoga or drug treatment, the GABA level did not change much more their pre-treatment value.

**DISCUSSION**

The precise biological basis of mental depression is not yet clearly known. Richter[16] (1957) proposed that depression may result from some impairment in the endocrine system.

The observations recorded in the present study also tend to suggest that there occur a number of neurohumoral and hormonal changes in the patients of mental depression. For example, the plasma serotonin level was found to be significantly decreased in mental depression. Other workers have also postulated that decreased brain serotonergic activity may be an important factor in certain types of affective disorders[15, 16, and 17]. Deficiency of tryptophan, a precursor of serotonin has also been demonstrated in cases of mental depression[18, 19]. Parachlorophenylalanine, an inhibitor of serotonin syntheses, reverses the therapeutic effect of antidepressants[20], further supporting the involvement of serotonergic activity in mental depression. In addition, decreased number of serotonin uptake sites[21] and tritiated – imipramine binding sites in blood platelets have also been reported in patients of mental depression[22]. Furthermore, the trycyclic antidepressant agents / are known to increase the efficacy of actecholamines and serotonin by preventing their re-uptake by the presynaptic neurones[7, 23]. This ultimately results in longer availability of these biomines at the synaptic cleft, which in turn stimulates the post synaptic cells for a longer period.

In the present study, the plasma monoamine oxidase contents were recorded to be increased along with an increase in urinary 5 – hydroxyindole acetic acid level in cases of depression. This finding suggest that possibly the turnover rate of serotonin is increased in mental depressive patients, because monoamine oxidase plays a major role in the metabolic degradation of serotonin thereby resulting into the increase in urinary 5 – hydroxyindole acetic acid level.

Plasma melatonin level was lower in the depressed patients. This may be related to the lower serotonin levels, because the latter is a major precursor in the melatonin synthesis in the pineal gland[24, 25].

In depressed patients, the plasma cortisol level was found to be significantly enhanced. Similar changes in plasma cortisol level have also been demonstrated in depressed patients by several earlier workers[26, 27]. On the other hand, the plasma melatonin contents were decreased in these patients. These observations are in accordance with those of previous investigators who have shown high cortisol / melatonin ratio is depressed patients[6].

The circulating level of plasma – aminobutyric acid in depressed patients did not significantly differ from that in the normal volunteers. Thus, the observations recorded in the present study and those of other workers clearly indicate that mental depression is generally associated with certain degree of abnormality in the neuroendocrine and endocrine systems. However, the exact mechanism of the involvement of various neurohormones and hormones in the pathogenesis of depression needs further exploration.

After six months practice of Kundalin Yoga, the depressed patients experienced better and regular sleep pattern, better digestion and a feeling of general well-being. These patients also appeared more active and exhibited improved social interactions. The blood pressure and pulse rate was also found to be lowered significantly at the end of 3 and 6 months practice of Kundalini Yoga. In depressed patients, after 3 and 6 months practice of Kundalini Yoga, the initially decreased levels of plasma serotonin, melatonin and glutamate were found to return towards normalcy. On the other hand, elevated plasma monoaxmineoxidase, cortisol and urinary 5 – hydroxyindole acetic

acid levels showed a significant lowering after practicing Kundalini Yoga.

Almost similar changes were also observed in patients treated with the antidepressant drug. In this group of patients the changes in terms of physiological and biochemical parameters were more marked at the end of 3 months. However, the subjective improvements were less marked in these patients as compared to those who practiced Kundalini Yoga. In addition, these patients experienced the known side effect of the antidepressant drugs.

According to Satyanesan and Sastry (1980)[28] the hypothalamo – hypophysical neuroendocrine complex is the regulator of the regulators and the pineal organ acts as a multipotent transducer. The CSF plays a major role in the neuroendocrine integration. At these sites the information obtained from internal and external environment are converted to neuroendocrine and endocrine signals and relayed all over the body to enable the individual to adjust himself with the ever changing environment and to maintain homoeostasis.

It appears that in mental depression there occur some alterations in the hypothalamo – hypophysical neuroendocrine complex, pineal organ and CSF ultimately leading to a variety of neurohumoral and hormonal changes and disturbed homoeostasis. Thus, quite possibly the beneficial effects of Kundalini Yoga in cases of mental depression is brought about by the stimulation of various autonomic nerve plexures (Chakras) ultimately leading to the activation of pineal organ which in turn help in maintaining a better equilibrium between sympathetic and parasympathetic activities and in maintaining a perfect homoeostasis. All these changes finally manifest as improvements in terms of physiological, biochemical and subjective parameters in depressed patients following the practice of Kundalini Yoga. The observations recorded in the present study also tend to suggest that in depressed patients thought the Kundalini Yoga takes little longer to exert its beneficial effects, the clinical improvements is relatively more persistent as compared to those treated with drug alone. In view of the known side effects of antidepressant agents, the Kundalini Yoga may possibly be accepted as an alternative effective non-medical measure in managing the mental depression cases.

## REFERENCES


1. Winokur, A.; Amsterdam, J., Caroff, S., Snyder, p. J. and Brunswick, D. Amer. J. Psychiat. 139 : 39 – 44 (1982).

2. Leblac, J. and Villemaire, A. Amer. J. Physiol. 218 : 1742 – 1745, (1970).

3. Gastpar, M. In "Biological psychiatry Today, (Obiols, J., Ballus, C., Monclus, E. G. and Pujol, J. *eds.*), Elsevier / North Holland Biomedical Press, Amsterdam, pp 535 – 540, (1979).

4. Creese, I., Burt, D. R. and Synder. S, H. Science 197 : 596 – 598, (1977).

5. Van Praag, H. M. In New Advances in the Diagnosis and Treatment of Depressive IIIness" (Mendleweiz, J., *ed)*, Excerpta Medica, pp 24 – 68, (1980).

6. Wetterberg, L., Beck – Friis, J., Kjellman, B. F. and Ljunggren, J. G. Circadian rhythms in melatonin and cortisol secretion in depression. Submitted to the Nobel Conference at Skokloster, Sweden, (1982).

7. Kalat, J. W. Biological psychology, Wadsworth Publishing Company, California, (1984).

8. Udupa, K. N. A Manual of Science and Philosophy of Yoga, Sarvodhya Sahitya Prakashana, Varanasi, (1978).

9. Goddenberg, H. Clin. Chim. Acta. 19 : 38 – 44, (1973).

10. Snyder, H. S., Axelrod, J and Zweig, M. Biochem. Pharmacol. 14 ; 831 – 835, 1965.

11. Saito, S. and Tokunaga, Y. J. Pharmacol and Exp. Therap. 157 : 546 - 554, (1967).

12. Ozaki, Y.; Lynch, H. I., and Wurtman, R. J. Endocrinology 98 : 1418 – 1429, (1976).

13. Mattingly, D. J. Clin. Pathol. 15 : 374 – 379, (1962).

14. Mc. Ewen, C. M. In "Methods of Enzymology" (Tabor, H. and Tabor, C. W. *eds.*), part A., New York, pp 692 – 698, (1971).

15. Mendels, J. and Frazer, A. Brit. J. Psychiat. 126 : 241 – 248, (1975).

16. Van Praag, H. M. In "Depression and Schizophrenia : A contribution on their chemical pathogenesis", New York, Spectrum publications, (1977).

17. Murphy, D. L., Campbell, I., Costa, J. L. In "Psycho – pharmacology: A generation of progress" (Lipton, M. A. Di Maseio, A., Killam, K. F. *eds*) Raven Press, pp 1235 – 1247, (1978).

18. Coppen, A. and Wood, K. Psychological Med. 8 : 49 – 57, (1978).

19. Van Praag, H. M. In "Biological psychiatry Today (Obiols, J., Ballus, C., Monclus, E. G. and Pujol, J. *eds.*), Biomedical press, Amsterdam, (1979).

20. Shopsin, B., Friedman, E. and Gershon, S. Arch. Gen. Psychiat. 33 : 811 – 822, (1976).

21. Meltzer, H. Y., Busch, D., Fang, V. S. Psychoneuroendocrinology 6: 17 – 36, (1981).

22. Stanley, M.; Viggilio, J and Gershon, S. Science. 216 : 1337 - 1339, (1982).

23. Shopsin, B., Friedman, E., Gershon, S. Arch. Gen. Psychiat. 33 : 811 – 819, (1974).

24. Quay, W. B. Gen. Comp. Endocrinol 3 : 473 – 480, (1965).

25. Wetterberg, L. J. Neurol. Trans. Suppl. 13, 108 – 117, (1978).

26. Gibbions, J. L. Arch. Gen. Psychiat. 10: 572 – 575, (1964).

27. Carroll, B. J., Feinberg, M., Greden, J. F., Tarika, J., Albala, A. A., Haskett. R. F., James, N., Kronfol, Z., Lohr, N., Steiner, M., de Vigue, J. P. and Young, E. Arch. Gen Psychiat. 38 : 15 – 22, (1981).

28. Satyanesan, A. G. and Sastry, V. K. S. The Yoga Review. Vol.1, No. 4, 175 – 189, (1980).