

## Role of Antioxidants in Generalised Anxiety Disorder

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### ABSTRACT

Though there are wide range of stress induced disorders, anxiety is the core symptoms of all stress induced disorders and Generalized Anxiety Disorder (GAD) is the commonest syndromal presentation.

To combat the biochemical changes which occur as a result of stress there is antioxidant defence in the biological system. Secondary defence is by the non-enzymatic antioxidants like Vitamin E, Vitamin C, Vitamin A.

Therefore the authors interest was aroused to examine the status of these antioxidants in biological system of patients suffering from stress induced psychiatric disorders.

The study was carried out with following aims:-

1. To find out whether patients with GAD have any difference in blood serum levels of Vitamin A, C & E in comparison to normal healthy control group.
2. To find out whether supplementation of adequate doses of Vitamin A, C & E leads to improvement in anxiety and reduction in scores of the patients.

60 subjects in the age group of 20-60 years who attended psychiatric clinic of a private hospital, who met inclusion and exclusion criterion of the study and consented for psychological evaluation and blood screening to find out the serum levels of Vitamin A, C and E were included in the study. Approval was sought from the institutional ethics committee for collecting blood sample of these subjects before and after the Vitamin A, C and E supplements given for a period of 6 weeks.

It was observed that patients with GAD had significantly lower levels of Vitamin A, C and E in comparison to healthy controls after dietary supplementation of these vitamins for a period of 6 weeks it was observed that there was significant reduction in anxiety scores of patients. A significant increase in the blood levels of antioxidants was observed in patients.

Findings suggest that antioxidant supplement therapy as an adjuvant therapy is useful in patients with stress induced psychiatric disorders results have been discussed.

### Key word:

1. GAD- Generalised Anxiety Disorder
2. HAM-A- Hamilton Anxiety Rating Scale
3. ICD-10. (International Classification of Diseases X version)

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## INTRODUCTION

In the era of scientific development technological advances, cut throat competitions, thrive for superiority and increasing lifestyle demands have made human population more prone for stressful disorders and with the advent of media, the news of catastrophes and natural calamities across the globe has further increased the feeling of insecurity in human minds.

When we talk about stress in day to day life, we are not talking about disorders because now it's a part of life which may reflect in the form of aging but not disorders. Disorder is said to be present when some of these stressors are continuously acting over a period of time and have started showing up in the form of certain symptoms/symptom clusters, which persist and reflect work efficiency, mood, sleep, appetite.

There have been number of studies which have evaluated role of antioxidants and oxidative stress leading to varieties of health problems including Leukemia<sup>1</sup>, Thalassemia<sup>2</sup>, Ischemic Stroke<sup>3</sup>, Hemodialysis<sup>4</sup>, Myocardial Infarction<sup>5,6</sup> rheumatoid arthritis<sup>7</sup>, critically ill patients<sup>8</sup>, and postmenopausal women<sup>9</sup>.

Though there are wide range of stress disorders, anxiety is the core symptoms of all stress induced disorders and Generalized Anxiety Disorder (GAD) is the commonest syndromal presentation. Majority of patients with GAD have an overlap of depressive symptoms vis a vis patients suffering from depression also have features of anxiety and a sizable numbers of patients suffer from mixed anxiety depression syndrome .

Anxiety is response to a threat that is unknown, internal, vague or conflictual, it is an altering signal, it warns of impending danger and enables a person to deal with threat . Stress places additional demand on body, in terms of nutrition. In condition of stress there is increase in adrenal production and mobilization, utilization of vitamin and minerals eg. Vitamin C, Vitamin E, magnesium, potassium and micronutrients,

which further accelerates metabolism of proteins, fats and carbohydrates as a result produces quick energy to overcome stress.

To combat the biochemical changes which occur as a result of stress there is antioxidant defence in the biological system. The primary defence is by enzymatic antioxidants like Superoxide Dimutase (SOD), Glutathione Peroxidase (GPx), Catalase, (CAT), Nicotamide adenine Diphosphate (NADPH), Glutathione transferase and Glutathione reductase, while secondary defence is by the non-enzymatic antioxidants like Vitamin E (alphatocopherol), Vitamin C (Ascorbic Acid), beta carotene, minerals and trace elements like zinc.

Therefore the authors interest was aroused to examine the status of these antioxidants in biological system of patients suffering from stress induced psychiatric disorders (particularly GAD) and healthy individuals and to examine whether supplementation of antioxidants leads to change in their psychiatric status. In view of the above information and literature available on the subject very little work has been done in India to explore role of antioxidants in combating oxidative stress in GAD.

## OBJECTIVES:

Hence the study was carried out with following aims:-

1. To find out whether patients with GAD have any difference in blood serum levels of Vitamin A, (beta carotene), Vitamin C & Vitamin E in comparison to normal healthy control group.
2. To find out whether supplementation of adequate doses of Vitamin A (beta carotene), Vitamin C & Vitamin E leads to improvement in anxiety and reduction in scores of the patients.

## MATERIAL AND METHODS

In order to fulfill the above aims 60 subjects in the age group of 20-60 years who attended psychiatric clinic of a private hospital, Jaipur, who consented for psychological evaluation

and blood screening to find out the serum levels of Vitamin A, Vitamin C and Vitamin E were included in the study. Approval was sought from the institutional ethics committee for collecting blood sample of these subjects before and after the Vitamin A, Vitamin C and Vitamin E supplements given for a period of 6 weeks. 40 patients of GAD and 20 healthy controls were included in the study. Patient attending out patient clinic of the hospital for treatment were included after obtaining informed consent.

Diagnosis of patients diagnosed in the OPD of the Hospital was confirmed as per ICD-10 diagnostic criteria and specially designed performa was filled up.

#### **INCLUSION CRITERIA:**

All patients included in the study met the following inclusion criteria.

1. Diagnosis of GAD as per ICD-10. (International Classification of Diseases X version, WHO)
2. Age range 20-60 yrs of age.
3. Matched on sociodemographic data (age, sex, education and economic status) with control group.
4. Treatment naive for last six months or diagnosed for the first time.

#### **EXCLUSION CRITERIA:**

Any Patient meeting one or more of the following were excluded from the study.

1. Any chronic physical illness (Diabetes, Coronary Artery Disease, Chronic lung disease, cancer etc)
2. History of drug dependence.
3. Exposed to any antioxidant therapy in past.
4. Women with symptoms of post menopausal syndrome (hot & cold flushes)

Patients fulfilling above inclusion and exclusion criteria were subjected to psychiatric and nutritional evaluation. They were administered Max Hamilton Anxiety rating scale (HAM- A) to evaluate level of Anxiety, 24 hours recall method and food frequency

questionnaire were employed in order to ensure that patient consumed similar diet through out of the study period. Data were recorded at base line visit and after 6 weeks however patients were clinically evaluated by the psychiatrist once in 2 weeks and investigator was blinded to the psychiatric evaluation.

All Patients were divided in 2 groups

Group A – 40 Patients with diagnosis of GAD.

Group B - 20 Normal Healthy subjects chosen from care givers of Patients who were found to be not suffering from Anxiety on clinical evaluation by the Psychiatrist.

Group A was further subdivided in Group A<sub>1</sub> and A<sub>2</sub> (20 Patients each). Patients in Group A<sub>1</sub> were given regular antianxiety treatment by the psychiatrist while patients included in group A<sub>2</sub> were given regular antianxiety treatment and supplementation of Vitamin A, Vitamin E and Vitamin C in capsule and tablet forms. The antioxidants included 600 mg/day of Vitamin A, 1000 mg/day of Vitamin C and 800mg/day of Vitamin E Vitamin A and Vitamin C were in the form of tablets containing 300 mg and 500 mg of each respectively while Vitamin E was in the form of capsules 400 mg in each capsule all of them were given twice a day at a interval of 12 hours.

Blood sample was drawn to evaluate the serum levels of antioxidants, Biochemical estimation of serum levels of Vitamin A ( $\beta$ -carotene), Vitamin C, and Vitamin E were done using the standard techniques of estimations.

Data were subjected to statistical evaluation.

#### **RESULTS**

Experimental group (Group A patients with GAD and Group B healthy controls were statistically comparable on socio-demographic data biochemical estimations and their comparison with healthy control group is as follows:

**Table 1: Baseline comparison of serum antioxidants of experimental GAD and healthy control**

Serum Antioxidant	Experimental GAD (Group A <sub>2</sub> ) N=20	Healthy Control (Group B) N = 20	t	Significance
Vitamin A (□g)	40.18 SD± 9.16	132.92 SD± 3667	11.18	S
Vitamine C (mg)	0.79 SD± 0.21	0.96 SD± 0.37	4.08	S
Vitamin E (mg)	0.53 SD± 0.21	0.79 SD± 0.21	3.96	S

**Table 2: Vitamin A Level – Prior and Post antioxidant supplement in GAD Patients**

Serum Antioxidant	Pre N=20	Post N=20	t	Significance
Vitamin A (mg)	40.18 SD± 9.79	49.49 SD± 10.38	-2.98	S

**Table 3: Vitamin C Level – Prior and Post antioxidant supplement in Anxiety Patients**

Serum Antioxidant	Pre N=20	Post N=20	t	Significance
Vitamin C (mg)	0.6 SD± 0.16	0.87 SD± 0.24	-4.22	S

**Table 4: Vitamin E Level – Prior and Post antioxidant supplement in Anxiety Patients**

Serum Antioxidant	Pre N=20	Post N=20	t	Significance
Vitamin E (mg)	0.53 SD± 0.21	0.69 SD± 0.13	-2.93	S

**Table 5: Pre and post scores of HAM- A in GAD experimental group**

Group	Pre N=20	Post N=20	t	Significance
HAM-A	36.57 SD± 6.93	2.95 SD± 6.32	16.42	S

## DISCUSSION

As evident from table 1 of the results it can be seen that blood levels of β-carotene (Vitamin A), Vitamin C and Vitamin E are significantly lower in experimental group (Patients of GAD) in comparison to healthy control. These findings have also been earlier reported. Psychiatric symptoms of vitamin C deficiency include depression, hysteria, and hypochondriacal symptoms, Research shows that anxiety can be eased by taking certain vitamins which includes vitamin C (12).

Anxiety scores have been reduced significantly in the group consuming

antioxidant supplements for a period of 6 weeks (table 5). At the same time it has been observed that post supplement antioxidants levels in the blood have increased to a significant level in experimental groups (patients of anxiety) which was seen in accordance with the improvement in their clinical status (tables 2,3,4). Antioxidant have also been found to be low in patients with schizophrenia (10, 11, and 13) another psychiatric disorders.

To the best of our knowledge there have been very few studies which have shown a systematic comparison of pre and post

antioxidant status in stress induced psychiatric disorders. Therefore it is suggested that this should be replicated in wider interest of the patients.

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