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## MIRACLES OF DIETARY VITAMINS AND MINERALS IN PSYCHIATRIC DISEASES

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Scientists of the day are very much serious about psychiatric diseases because the above diseases are spreading vigorously throughout the world making so many people crippled in life. So scientists are eager to find ways out to overcome the problem. When affected with psychiatric diseases, medical treatment is essential, but that is very painful and time taking. The other way to avoid the situation is to take care so that the diseases could be prevented, which is possible by proper choice of food habits. The objective of this investigation is to make a quantitative estimate of the vitamins and minerals supply per day from a proposed vegetarian diet, since nutrients play important role to safeguard against various mental diseases. Actually, medicines for some mental diseases contain high doses of vitamins and minerals while a mild dose of the same can act as a preventive for the diseases. Method: In order to estimate the amount of vitamins and minerals obtainable per day from the proposed diet, the quantities of ten vitamins and ten minerals in each item of the diet have been evaluated and added up to get the daily intake of the above. The amount of vitamins and minerals obtained thus far have been compared with the daily intake amount necessary to prevent the psychiatric diseases. Results: The results exhibit that the quantities of vitamins and minerals obtained daily from the proposed are quite comparable to the daily intake amount necessary to prevent some mental diseases. A comparison of the amount of vitamins and minerals obtained from the proposed diet daily with the medicinal doses, shows that the diet cannot compete with the latter. Conclusion: From the result of investigation it may be concluded that by proper choice of daily diet many psychiatric diseases occurring due to deficiency of vitamins and minerals could be prevented. However, when somebody is attacked with the above diseases, diet alone cannot cure them, hence medicinal treatment is necessary. Since treatment is strenuous and time taking, so the final conclusion is: "prevention is better than cure".

**Keywords:** Psychiatric diseases, Vitamins, Minerals, Preventive doses, Daily intake, Fractional Percentage Variation (FPV)

### INTRODUCTION

Decades of research and treatment on mental diseases have demonstrated the importance of dietary nutrients for the same (Cornish and Mehl-Madrona, 2008). Though interest in such studies declined since the introduction of psychiatric medication, the recent works suggest the revival of dietary therapy (Niyogi, 2018a, 2018b and 2018c).

It has been found that antidepressant medications give poor response to the patient suffering from depression due to low level of vitamin B9 (Alpert *et al.*, 2000).

Similarly, effects of minerals like magnesium, zinc, copper and iron have been found to be positive in the cases of psychiatric patients.

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There are thousands of examples of how micronutrients play crucial role in the treatment of several psychiatric illnesses and much more informations are on the way to come as more investigations are carried out.

Thus nutritional psychiatry[online presentation by Cavaye—Why nutritional psychiatry is the future of mental health treatment, March 2, 2018, AEDT is a growing discipline to form as a part of an integrated treatment for mental health (Raju, 2017; and www.mentalhealth.org.uk, 2018) disorders.

Suggestions (Healthy Diet Eating with Mental Health in Mind, Online presentation of Healthy Diet: Eating with Mental Health in mind) have been made regarding healthy food in some elaboration but without specific items, here in this article, attempt has been made to find the nutritional value with special references to vitamins and minerals for a particular diet (Niyogi, 2015) and their applicability to control and check various mental diseases.

The vitamins namely thiamine, riboflavin, niacin, pantothenic acid, pyridoxine, biotin, folate (folic acid), vitamin B12, choline and vitamin D, and minerals like calcium, magnesium, zinc, iron, manganese, chromium, boron, copper, lithium and selenium are effective for treatment of the mental

diseases like anxiety depression, stress, mental fatigue, bipolar disorder, schizophrenia and multiple sclerosis.

## MATERIALS AND METHODS

The diet in consideration (Niyogi, 2015) is unique in the sense that it includes variety of foods which contain legume, vegetables, cereal, dairy products, fruits and refreshing items. Estimation of the relevant vitamins and minerals from each item of the diet have been made and added up to get the final result.

The result so obtained has been compared with the daily intake amount necessary as precautionary measure for the diseases mentioned above and the medicinal doses for the treatment of the patients already suffering from the diseases.

## RESULTS AND DISCUSSION

Since the vitamins and minerals mentioned earlier play important role in the control and check of various psychiatric disorders, it may not be out of point to discuss here how the above vitamins and minerals take part in the brain activity. The relevant nutrients and their brain functions are presented in Table 1 below.

**Table 1: The Vitamins and Minerals and their Functions to Save the Brain (Nootropics Expert, Tomen, 2018)**

Vitamins/Minerals (1)	Corrsponding Brain Functions (2)
Thiamine (B1) (Major, 2015; and Tomen, 2018) [12]	It may increase the energy and strengthen the immune system. It is used for enhancing learning abilities and preventing memory loss.
	It is used for maintaining a positive mental attitude which may improve the body's ability to control mood and handle stress.
	Deficiency of thiamine causes mental depression and memory loss.
	Thiamine is directly involved in the citric acid cycle that provides adenosine triphosphate (ATP) energy for mitochondria. It also plays a role in maintaining optimal levels of the neurotransmitters glutamate and gamma-aminobutyric acid (GABA), and contributes to the production of the enzyme pyruvate dehydrogenase (PDH) which is essential in making the neurotransmitter acetylcholine.
Riboflavin (B2) [12]	Riboflavin is responsible for proper transmission of neuropulses. It is required for energy production in every cell in the body. It produces glutathione which is an antioxidant and lever detoxification agent.
	It activates B6 and folic acid.
	The two flavoprotein coenzymes from riboflavin FMN (flavin mono nucleotide) and FAD (flavin adenine dinucleotide) are essential to most enzyme processes in everyone of our cells.
	FAD is required to produce pyridoxic acid from pyridoxine.
	It is also required to convert retinol to retonic acid.
	Both of the above can be used by our body.
FAD helps convert tryptophan to niacin. FAD and FMN are cofactors in the metabolism of fatty acids in brain cell membranes, the absorption and utilization of iron and the regulation of thyroid hormones.	

Table 1 (Cont.)

Niacin (B3)	Supplementation with niacin improves energy levels, that is why it is included in nootropic stacks for brain stimulation.
	Niacin acts as an antioxidant helping to eliminate free radicals which can damage brain cells. Niacin affects the cognitive function by producing dopamine, norepinephrine and serotonin which are involved in memory learning, cognition, recall and mood.
Pantothenic acid (B5)	Pantothenic acid is essential for the synthesis of acetylcholine (ACH). Adequate levels of ACH can boost focus, memory, learning and reduce brain fog.
	Vitamin B5 is at the heart of the KREB cycle and electron transport chain which helps convert nutrient from food into energy which is used to make adenosine triphosphate (ATP). This ATP is the fuel source within each of our cells. Higher energy in the cells increases mental clarity, alertness, memory and mood.
	As an agent in the synthesis of Coenzyme-A (COA), it synthesizes the neurotransmitters like acetylcholine, epinephrine and serotonin which affect alertness, cognition, memory and mood. B5 reduces stress, anxiety and depression.
Pyridoxine (B6)	It is a required coenzyme for the synthesis of dopamine, epinephrine, GABA, melatonin norepinephrine, and serotonin.
	A mild deficiency of B6 results in downregulation of GABA and serotonin synthesis.
	This leads to poor behavior, increased anxiety, depression and fatigue.
	Vitamin B6 concentration in the brain is much higher than in the blood so it is essential for optimum brain function.
Biotin (B7)	Biotin influences the use of branched chain amino acids (BCAAS) in the synthesis and release of serotonin from tryptophan and tyrosine from phenylalanine.
	Biotin is required for the synthesis of fatty acids for energy production in the brain. Lack of sufficient biotin can result in fatigue.
	Biotin is needed for the formation of myelin which protects axons.
	Deficiency of Biotin can result in reduced brain cell signaling and symptoms of seizures, learning disabilities, hallucinations, depression and fatigue.
	Our body cannot synthesize Biotin, so it must be supplied externally.
Folate (folic acid) (B9)	Folate converts homocysteine to methionine which is used in the synthesis of S-Adenosyl-Methionine (SAME).
	It is also involved in gene expression, amino acid synthesis, myelin synthesis and is required for the synthesis of the neurotransmitters dopamine, epinephrine, norepinephrine and serotonin.
	Folate deficiency leads to depression. Folate is found to be present in every function in the brain.
	It is essentially important for fully optimized brain.
	Folate levels even in the normal range may be insufficient for methyl donation and neurotransmitter synthesis.
	Supplementing with folate with adequate levels of the same helps to alleviate depression, improve memory and ward off dementia.
Cobalamin (B12)	Cobalamin is essential for the synthesis of neurotransmitters, maintenance of myelin sheaths protecting neurons.
	B12 helps in the synthesis of dopamine, GABA, norepinephrine and serotonin affecting alertness, cognition, memory and mood.

Table 1 (Cont.)

Choline (Bekdash, 2016; and Tomen, 2017) [13]	Choline is a water soluble nutrient related to the B vitamin group which is needed by our system for normal brain function and development. Choline assists in methylation involved in genetic expression. It is critically needed for the synthesis of the key neurotransmitter acetylcholine which is used by the brain to maintain clear communication between its billions of neurons. Infact choline is vital to cognition and nerve function, without it, we could not move, think, sleep or remember anything. Choline and acetylcholine are needed for the basics of attention, focus, memory, mood, etc.
	Deficiency of choline leads to poor recall, memory loss, fatigue, brain fog, inability to learn and feeling irritable.
Vitamin D (Rachel, 2017) [14]	Vitamin D helps regulate the immune system and the releases of neurotransmitters like dopamine and serotonin. These neurotransmitters affect brain function and development—consequently the mental health receptors for Vitamin D are in the regions of the brain that are linked to depression.
	Deficiency of D vitamin may lead to excessive fatigue, depression or other mental issues like anxiety, bipolar disorder, schizophrenia or schizoaffective disorder.
Calcium (Tomen, 2018) [15]	Calcium is the most abundant mineral in our body. Calcium ions play a crucial role as a secondary messenger in the brain cell, involved in the release of neurotransmitters from neurons.
	Calcium plays a critical role in the areas of the brain responsible for strong and retrieving memory.
	Without going into the detail of activities of calcium in the brain it may be concluded that the process of communication between the neuron's axons and dendrites which has calcium in its core, memories are formed and affects alertness, concentration, cognition and mood.
	Some drugs used to lower blood pressure blocks the calcium channel in the brain which leads to brain damage and memory loss.
Magnesium [15]	This mineral is crucial for optimal cognitive health.
	Magnesium assists in converting food to produce adenosine tri phosphate (ATP) which is the primary fuel source for mitochondria.
	It regulates the activity in neuron ion channels. These channels govern the flow of neurotransmitters in neurons.
	Magnesium also regulates brain synaptic plasticity which is critical for learning and memory.
	Raising brain magnesium levels restore neuroplasticity and improve cognitive function.
	It helps an increased level of focus, energy, memory and cognitive ability when supplemented.
	Magnesium improves quality of sleep and mood.
Zinc [15]	Zinc is an essential mineral for optimal brain health and cognition.
	It regulates the signaling cascades, gene transcription and neurotransmitter transport.
	Zinc increases serotonin uptake in select brain regions which increases the efficacy of antidepressants. So it reduces depression as it increases BDNF.
	Zinc is necessary for memory formation. Low levels of zinc are found in depression and the lower the level of the same, more severe is the depression.
	It also protects against cognitive decline due to toxic copper levels.

Table 1 (Cont.)

Iron [15]	Iron is essential for brain function because of its role in oxidative metabolism.
	It is a cofactor in the synthesis of neurotransmitters and myelin.
	Iron is needed for the synthesis of serotonin, norepinephrine and dopamine which take part in the normal functioning of the brain.
	Drop in the iron levels in the brain give rise to reduction of dopamine receptor which has direct negative effect on learning and memory.
	Serotonin transport density decreases with drop in the iron level along with decreased uptake of norepinephrine which result in poor attention, concentration and depression.
	In adults, symptoms of iron deficiency are anxiety, brain fog, depression, fatigue, irritability, restlessness, poor concentration and insomnia.
Manganese [15]	Manganese is a required cofactor for several enzymes necessary for neuron and glial cell function in the brain. It is involved in neurotransmitter synthesis and metabolism.
	Manganese is necessary in the formation of astrocytes.
	These glial cells help form endothelial cells for blood-brain barrier, help repair the brain following traumatic brain injury.
	Eventhough manganese deficiency is uncommon, but not enough level of this trace mineral may result in lower IQ and and enhanced susceptibility to seizures.
	However excess manganese deplete dopamine in the brain.
Chromium [15]	Trivalent chromium is used in the form of chromium picolinate, which increases the body's sensitivity, which boosts the production of serotonin in the brain, reducing depression and persistent depression (disthymic disorder) and insulin and help cells extract glucose in the blood and is used as energy.
	Chromium picolinate improves learning, recall and memory in older adults.
	It may help reduce a typical depression symptom like mood swings.
Boron [15]	Boron boosts natural antioxidant and protects against the free radical.
	Boron is urgent in the formation and use of SAME.
	This SAME is again involved in the synthesis of acetylcholine, dopamine, serotonin and norepinephrine.
	Thus it helps to normalize mood, moderste behavior and elevate emotions.
	Excess borate can exhibit irritability, convulsion, lethargy and depression.
Copper	Copper is a required cofactor in various copper containing enzymes that control neurotransmitters like dopamines.
	It participates in the creation of myelin and endorphin recycling.
	Neurons and glial cells in the brain need copper for basic respiration.
	Copper modulates neuron activity and is essential in the normal development of synapses.
	Copper is required so that the brain can use antioxidants vitamin C, etc., needed for preventing free radical damage in the brain.
	Copper deficiency in our system may give rise to fatigue, concentration trouble and poor mood.
	When copper levels are high, more norepinephrine and epinephrine are synthesized from dopamine which can cause feeling of agitation, anxiety, panic, depression, restlessness and insomnia. [Tsafr. J, copper toxicity a common cause of psychiatric symptom] [16] www.medsafe.com

Table 1 (Cont.)

Lithium (Lithium treatment for bipolar disorder, 2018) [17]	Lithium is one of the most widely used medication for treating bipolar disorder.
	It helps reducing the severity and frequency of mania. It may also prevent bipolar depression and reduce suicidal risk.
	It is thought that lithium helps strengthen the nerve cell connections in the brain regions which are involved in regulating mood, thinking and behavior.
Selenium	Selenium is a trace mineral essential for various aspects of health. Its method of action is its incorporation in selenoproteins.
	The selenoprotein genes work as antioxidant enzymes protecting the brain cells from inside.
	The selenoproteins are involved in co-ordination, memory, cognition, and other brain signaling pathways.
	Selenium takes important role to activate catecholamines, dopamine, norepinephrine and epinephrine.
	Selenium is important for the development and functioning of GABA.
	Dopamine pathways are dependent on selenium.
	Acetylcholine neuro transmission needs selenium.
	Deficiency of selenium are linked with anxiety, confusion, depression and hostility.

From Table 1 it is crystal clear that the vitamins and minerals presented here play crucial roles in the normal functioning of human brain and prevent mental diseases.

While the medicinal supply of the above may give rise to various side effects inconveniencing to normal functioning of daily life, the dietary supply of the above do not cause any such problem.

Thus it may be concluded that proper supply of food is superior to medicine in preventing and combating the psychiatric diseases.

However, as has been mentioned earlier, when one is completely affected with mental diseases diet alone cannot help the patient in overcoming the diseases. In that situation medicine is a must for the patient (Niyogi, 2018).

So we are now in a position to evaluate the amount of the above vitamins and minerals in a daily diet, specially the one prescribed earlier (Niyogi, 2015).

Tables 2 and 3 below summarise the amount of vitamins and minerals obtainable daily from the prescribed diet and the daily intake amount necessary respectively.

From Tables 2 and 3 it is evident that the daily consumption of vitamins and minerals from the proposed diet is quite comparable to that from daily intake amount required. So, it may be concluded that the proposed diet is sufficient to prevent the mental diseases which could be

happening from deficiency of the above vitamins and minerals.

The only exception being Zinc and Boron. The amount of Zinc and Boron obtainable daily from the proposed diet is much less than the necessary daily intake amounts. So this deficiency of Zinc and Boron in the proposed diet has to be subsidized externally.

In order to have a better understanding of the contents of Tables 2 and 3, Fractional Percentage Variation (FPV) for each nutrient above have been presented in Table 4 below where

$$FPV = \frac{\text{Element from Table 2} - \text{Corresponding element from Table 3}}{\text{Element from Table 2}} * 100$$

In Table 4 the FPV values of vitamins and minerals show that some of them are positive while others are negative. The positive values indicate that the supply of the nutrients from the proposed diet is more than the daily intake amount required. The negative values of FPV indicate that the daily supply from the proposed diet is less than the daily intake amount.

In those cases, other sources of vitamins and minerals have to be sought for. The results of FPV values of the nutrients are depicted pictorially in the graphs of Figures 1 and 2 respectively.

Having presented the daily amounts of vitamins and minerals obtainable from the proposed diet and the intake

**Table 2: Estimation of Vitamins and Minerals from the Proposed Diet for Mental Diseases**

Vitamins/Minerals (1)	Range of Amount in mg/day (a)	Mean Value of Amount in mg/day (b)	S.D of Amount in mg/day (c)
Thiamine (B1)	1.62 to 3.85	2.735	-1.115
Riboflavine (B2)	2.56 to 3.61	3.085	-0.525
Niacin (B3)	20.33 to 29.37	24.85	-4.52
Pantothenic Acid (B5)	5.9 to 7.8	6.85	-0.95
Pyridoxine (B6)	2.91 to 3.5	3.205	-0.295
Biotin (B7)	0.037 to 0.04686	0.04193	-0.00493
Folate (Folic Acid) (B9)	0.656 to 1.038	0.847	-0.191
Cobalamine (B12)	0.0018 to 0.0024	0.0021	-0.0003
Choline	212 to 279	245.5	-33.5
Vitamin D	0.0054245	0.0054245	0
Calcium	844.36 to 1087.9	966.13	-121.77
Magnesium	382.56 to 570.34	476.45	-93.89
Zinc	2.22 to 5.41	3.815	-1.595
Iron	17.33 to 26.21	21.77	-4.44
Manganese	8.1022 to 9.644	8.8731	-0.7709
Chromium	0.102 to .0120	0.111	-0.009
Boron	3.756 to 4.05	3.903	-0.147
Copper	1.664 to 2.5839	2.12395	-0.45995
Lithium	1.44 to 1.46	1.45	-0.01
Selenium	0.140 to 0.152	0.146	-0.006

**Table 3: The Daily Intake Amount of Vitamins and Minerals Required for the Prevention of Mental Diseases (NIH Report on Vitamin and Mineral Daily Intake)**

Vitamins/Minerals	Range of Amount in mg/day (a)	Mean Value of Amount in mg/day (b)	S.D of Amount in mg/day (c)
Thiamine (B1)	1.2 to 1.7	1.45	-0.25
Riboflavine (B2)	1.4 to 2.1	1.75	-0.35
Niacin (B3)	20 to 21	20.5	-0.5
Pantothenic Acid (B5)	2 to 5	3.5	-1.5
Pyridoxine (B6)	1.4 to 2	1.7	-0.3
Biotin (B7)	0.030 to 0.035	0.0325	-0.0025
Folate (B9)	0.4 to 0.6	0.5	-0.1
Cobalamine (B12)	0.0024 to 0.0026	0.0025	-0.0001
Choline	200 to 375	287.5	-87.5

Table 3 (Cont.)

Vitamin D	0.010 to 0.020	0.015	-0.005
Calcium	600 to 1200	900	-300
Magnesium	400 to 800	600	-200
Zinc	8 to 12	10	-2
Iron	17 to 21	19	-2
Manganese	2 to 5	3.5	-1.5
Chromium	0.030 to 0.045	0.0375	-0.0075
Boron	3 to 20	11.5	-8.5
Copper	1 to 2	1.5	-0.5
Lithium	0.2 to 1	0.6	-0.4
Selenium	0.055 to 0.070	0.0625	-0.0075

**Table 4: Fractional Percentage Variation (FPV) of the Mean Values of the Vitamins and Minerals as Obtained from Table 2 and Table 3 Respectively**

Vitamins/Minerals (1)	Mean Amount in mg/day Obtained from Table 2 (A)	Mean Amount in mg/day Obtained from Table 3 (B)	FPV = (A-B)/A*100
Thiamine (B1)	2.735	1.45	46.98
Riboflavine (B2)	3.085	1.75	43.27
Niacin (B3)	24.85	20.5	17.51
Pantothenic Acid (B5)	6.85	3.5	48.91
Pyridoxine (B6)	3.205	1.7	46.96
Biotin (B7)	0.04193	0.0325	22.49
Folate (Folic Acid) (B9)	0.847	0.5	40.97
Cobalamine (B12)	0.0021	0.0025	-19.05
Choline	245.5	287.5	-17.11
Vitamin D	0.0054245	0.015	-1.77
Calcium	966.13	900	6.84
Magnesium	476.45	600	-25.93
Zinc	3.815	10	-162
Iron	21.77	19	12.72
Manganese	8.8731	3.5	60.55
Chromium	0.111	0.0375	66.22
Boron	3.903	11.5	-195
Copper	2.12395	1.5	29.38
Lithium	1.45	0.6	58.62
Selenium	0.146	0.0625	57.19

amount required, it may now be interesting to see the amounts of the above necessary when somebody is affected with mental diseases, i.e the medicinal doses.

In Table 5 below, the medicinal doses of the nutrients are presented which confirms that when one is affected

Table 5 (Cont.)

Table 5: Medicinal Doses of Vitamins and Minerals for Various Psychiatric Diseases	
Vitamins/Minerals (1)	Medicinal Doses in mg/day (2)
Thiamine (B1)	i) 50 to 100 for depression
	ii) 100, 2 or 3 times for schizophrenia
	iii) 250 for anxiety, anorexia, chronic fatigue, insomnia
Riboflavine (B2)	i) 50 for schizophrenia
	ii) 25 for cognitive function
Niacin (B3)	i) 3000 to 6000 for schizophrenia (Long term treatment)
	ii) 3000 for depression
	iii) 1000 three times a day for bipolar disorder
Pantothenic Acid (B5)	i) 10000 for stress and schizophrenia
Pyridoxine (B6)	i) 150 for depression
	ii) 100-400 for schizophrenia
	iii) 100-200 for bipolar disease
Biotine (B7)	i) 5 for bipolar disease
	ii) 10 for depression and schizophrenia
	iii) 300 for multiple sclerosis
Folate (B9)	i) 2 for depression and schizophrenia
	ii) 1 for bipolar disease of women
	iii) 2 for bipolar disease of men
	iv) .6 for autism spectrum disorder
Cobalamine (B12)	i) 0.4 for depression and schizophrenia
	ii) 0.3 to 0.6 for bipolar disease
Choline	i) 550 to 3500 for schizophrenia of men and 425 to 3500 for schizophrenia of women
	ii) 2000 to 8000 for bipolar disorder
	iii) 12000 to 16000 for complex partial seizure

Vitamin D	i) 0.125 to 0.25 for depression and schizophrenia
	ii) 0.175 for bipolar depression
Calcium	i) 1000 to 1300 for depression
Magnesium	i) 125 to 300 for depression
	ii) 300 for anxiety
	iii) 375 for mania
	iv) 600 for schizophrenia
	v) 200 twice a day for ADHD
Zinc	i) 30 to 40 for depression and anxiety
	ii) 22 twice a day for OCD
	iii) 25 to 50 for bipolar disease
	iv) 25 to 100 for schizophrenia
Iron	i) 8000 to 18000 for depression, fatigue, irritability and brain fog.
Manganese	i) 8 for depression
	ii) 300 for schizophrenia
Chromium	i) 0.6 for depression
	ii) 0.6 to 0.8 for bipolar disease
	iii) 0.4 for schizophrenia
Boron	i) 0.25 to 3.25 for cognitive function
Copper	i) 4 for alzheimer disease
	ii) Low dose of 0.15 for panic attack and severe anxiety
Lithium	i) 300 to 900 for depression
	ii) 900 to 1800 for bipolar disease and schizophrenia
	iii) 150 for cognitive function
Selenium	i) 0.1 for depression, anxiety and mood disorder
	ii) 0.2 to 0.4 for schizophrenia

**Note:** [https://depressedisorder.blogspot.com/2012/04/vitamin-b1...; Kapur. S et al, use of random sequence riboflavin as a marker of medication, Compliance in chronic Schizophrenia, Vol. 6, No. 1, Dec-1991, pp. 49-53; Fousson Boh, Nicotinic acid, long term effectiveness in a patient with Bipolar Type-2 Disorder, Nutrients 2018, Jan 27, 10(2), p. 134; Lerner V *et al.*, Vitamin B6 as add on treatment in chronic schizophrenic and schizoaffective patients, Clinical Psychiatry, 63(1): pp. 54-8; Jo. Mc Namara *et al.*, Effects of oral choline on human complex partial seizures, Neurology 1980 Dec 30(12), pp. 1334-6; https://www.j-alz.com/content/alzheimers-disease-and-copper-biochemistry; D. Benton *et al.*, The impact of selenium supplementation on mood, Biol Psychiatry, 1991 Jun 1, 29(11): pp. 1092-8.

Figure 1: Fractional Percentage Variation of the Mean Values of Vitamins

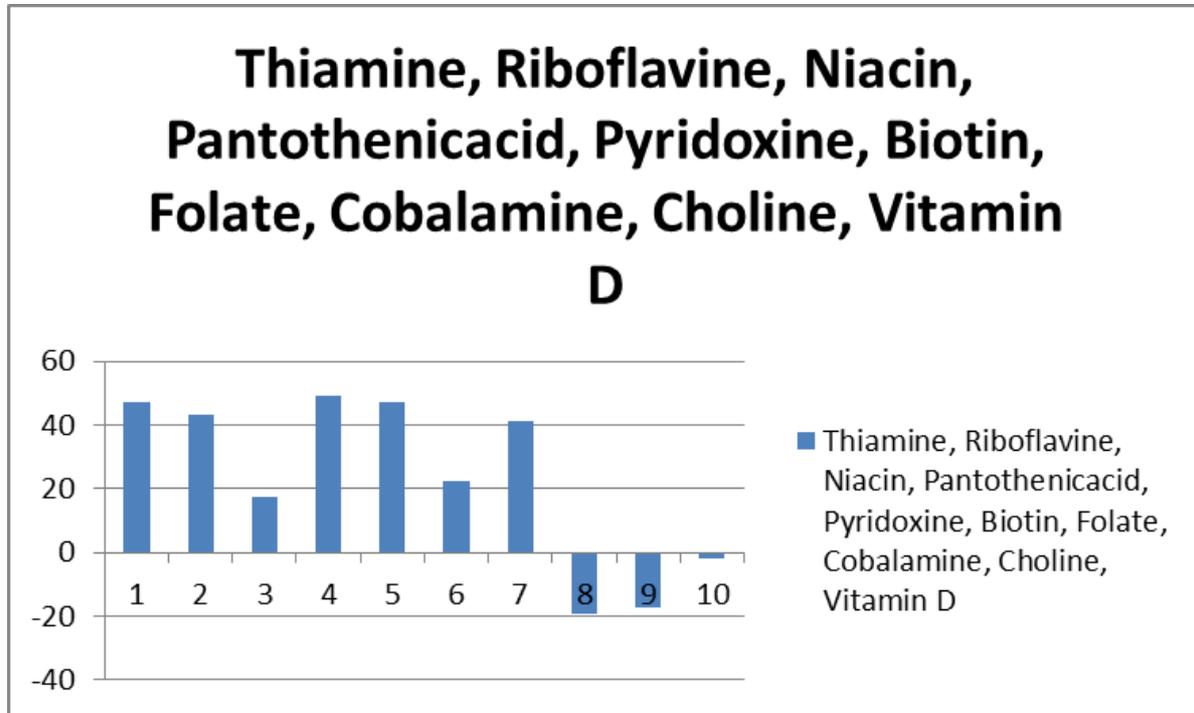
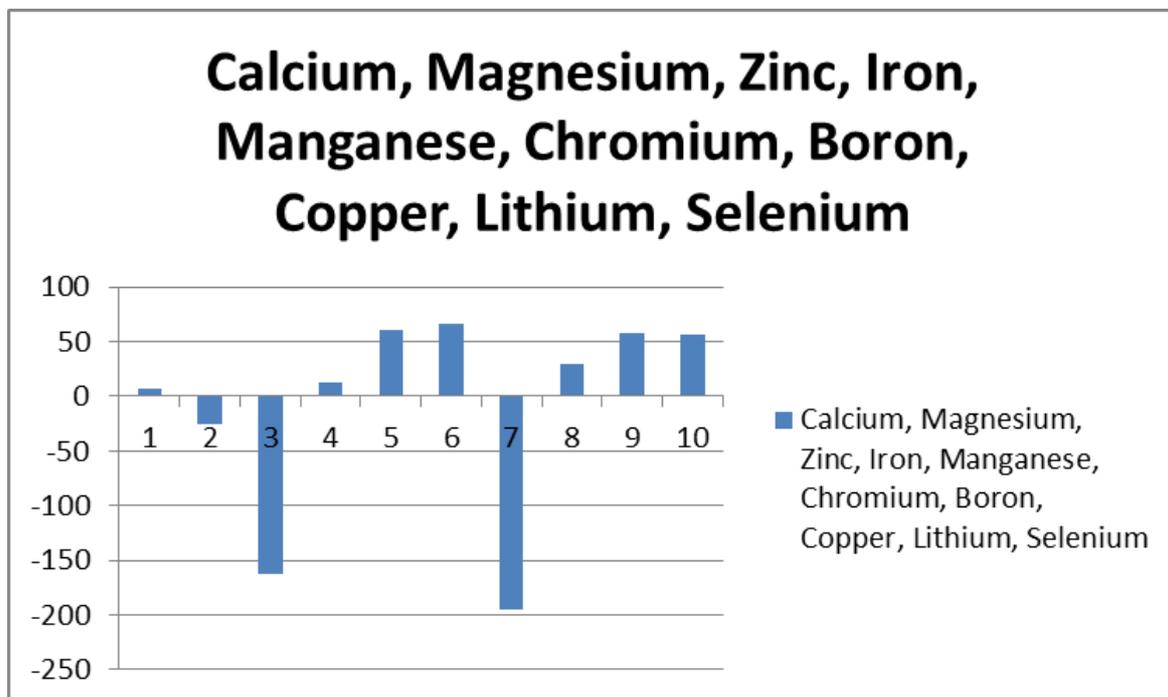


Figure 2: Fractional Percentage Variation of Mean Values of Minerals



with mental diseases, food alone cannot cure. Thus medicines with the help of doctors are essential.

A careful investigation of the data from Tables 2, 3 and 5 suggests that eventhough the amount of vitamins and minerals obtained from the proposed diet match quite successfully with the daily intake amount necessary for prevention of psychiatric diseases, the above are much less than the medicinal doses for mental diseases. Thus mental patients cannot be cured with diet alone, consequently doctors and medicines are essential for them.

## CONCLUSION

Psychiatric disease is a matter of grave concern throughout the world [Geneva Report, 2001; Iyer M, WHO Report, 2017, Times of India; Kamath V, Nimhans Studies; Mirror Bureau 2016; and Mc Philips DUs, among most depressed countries in the world, Data Editor, 2016].

So, scientists are engaged in investigation for the prevention and remedy of the above.

But remedy for the diseases could be painful and a long drawn process, so the other way of dealing the disease to take care for prevention of the same.

Vitamins and minerals in our daily diet may play important roles towards prevention of many psychiatric diseases. In this investigation, it has been shown that by proper choice of a vegetarian diet it is possible to get sufficient amount of vitamins and minerals per day which supersede the daily intake amount thereby preventing the diseases like anxiety depression, stress, mental fatigue, bipolar disorder, schizophrenia, multiple sclerosis and so on.

However, when someone is affected with the above diseases, food alone cannot supply sufficient vitamins and minerals necessary for the treatment of the diseases.

In those cases medicines are essential because the medicinal doses for treatment of diseases contain higher amount of vitamins and minerals as has been shown in Table 5.

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