

## **Opinion and Debate**

### **Nutritional factors in mental health: Does 'Epigenetics' provide a road map?**

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"The science of epigenetics may hold the key to our understanding of mental illness and behavioural disorders", this was stated by Dr. Bill Walsh in Ireland.<sup>1</sup> He believes that this science will provide a road map to more effective therapies for mental and behavioural disorders. According to him, biochemical factors are more important in causation of mental illness. For depression, deficiency of vitamin B6 has been identified as a major factor as this has the major role in production of serotonin. With vitamin B6 deficiency, there will be low serotonin and hence development of depression. According to Dr. Walsh, amino acids, fatty acids, vitamins and minerals, have a powerful impact on the synthesis of neurotransmitters or what happens when an electrical impulse crosses the synapse. Methylation appears to be the most powerful factor in epigenetics and gene expressions. His study on methylation on 25000 people with various mental and behavioural

disorders led him to believe that with 'over or under methylation', genes are turned off and on, this has a lot to do with production of proteins within the brain and body and where that has gone wrong.<sup>1</sup> Epigenetics is a mechanism that regulates gene expression not depending on the underlying DNA sequence, but on the chemical modifications of DNA and histone proteins. Insufficient nutrition, psychiatric drugs and mental stress alter epigenetic regulation.<sup>2</sup> Lakhan and Vieira<sup>3</sup> mention that daily supplements of vital nutrients often effectively reduce patients' mental health symptoms. They advocate the use of amino acids tryptophan, tyrosine, phenylalanine and methionine for treating depression. They identified biochemical abnormalities in people with bipolar disorder that include oversensitivity to acetylcholine, excess vanadium, vitamin B deficiencies, taurine deficiency, anaemia, omega-3 fatty acid deficiencies and vitamin C

deficiency. Glycine in high doses has found to reduce the symptoms of schizophrenia.<sup>3</sup> Hoffer A<sup>4</sup> advocates 'orthomolecular therapy' where prescription of thiamine (B1) for depression and chemical addictions, niacinamide for schizophrenia and children with learning and behavioural disorders, folic acid for depression and other nutritional supplements for a variety of disorders. High stress level in severely ill psychiatric patient may have magnesium deficiency. Selenium can elevate low mood. Folate has been found deficient among depressives, low zinc levels is associated with Anorexia Nervosa, low B12 with Obsessive Compulsive Disorder; low levels of B12 and Magnesium in autism are worth noting. High levels of homocysteine and low folate lead to poor ability to recall words and details of a brief story.<sup>5</sup> Protein energy malnutrition and deficiency of nicotinamide, vitamin B12, folate and thiamine, have long been recognized to cause severe confusion. Hypo or hyperglycaemia and hypertriglyceridaemia can cause cognitive deficits.<sup>6</sup> Malnutrition among growing children can cause cognitive problems. A study<sup>7</sup> described that supplementary feeding of infants and young children resulted in significant increase in cognitive development and school performance through adolescence. The Western diet consumed in a growing number of countries is devoid of many of the key nutrients critical for the proper functioning of the nervous system. It was recommended that clinicians should consider a low-glycaemic, modified Mediterranean diet rich in fruits, vegetables, whole grains etc. for optimizing mental health.<sup>8</sup>

Jacka FN et al<sup>9</sup> conducted a study to examine the association of western and traditional diet with depression and anxiety among women in Australia. They found that after adjustments for age, socioeconomic status, education, and health behaviours, a 'traditional' dietary pattern characterized by vegetables, fruit, meat, fish and whole grains was associated with lower odds for major depression or dysthymia and for anxiety disorders. A 'western' diet of processed or fried food, refined grains, sugary products and

beer was associated with a higher GHQ-12 score. A study<sup>10</sup> conducted on Afghan refugee children did not reveal severe malnutrition among the sample subjects; however, mental symptoms were prevalent in all camps, largely unrelated to the nutritional status. Study<sup>11</sup> in four developing countries showed a relation between high maternal common mental disorders and poor child nutritional status in India and Vietnam. Findings from Peru and Ethiopia did not provide clear evidence for a similar association in the same study.

Science of epigenetics is fascinating and gives a clear path for further exploration. In Pakistan, there is no general trend for investigation of vitamin and mineral levels. If the routine assessment of these be in vogue especially for those who are mentally unwell, prevention of mental disorders and promotion of mental well-being may be quite possible.

## References

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