

FUNCTIONAL CHANGES IN HUMAN BRAIN IN ANXIETY DISORDERS: A REVIEW

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ABSTRACT

Anxiety disorders rank among the most prevalent psychiatric disorders worldwide. Ayurveda approaches mental disorders through functional concepts such as being imbalanced *Dosha* or malfunctioning of the *Manovaha Srotas*. The aggravation of *Vata* demonstrates considerable similarity to autonomic dysfunction and heart rate variability. Extraordinary prevalence of *Rajas* and *Tamas* can be linked to heightened catecholaminergic activity and reduced activity of the prefrontal cortex. *Ojas* deficiency can be equated to fluctuations of neurotrophic factors and processes of regulation of cortisol, while *Ama* accumulation can be likened to increased production of inflammatory mediators. Functioning of the *Manovaha Srotas* can also be compared to high activity of the amygdala and impaired prefrontal amygdala connection. This review article described functional changes in human brain during the anxiety disorders.

KEYWORDS: *Ayurveda, Anxiety, Manovaha Srotas, Rajas, Tamas.*

INTRODUCTION

According to Ayurveda, anxiety disorder may be defined in accordance with the concept of *Chittodvega*, which describes a condition of disturbance of *Manas*, which is mainly associated with the aggravation of *Vata Dosha*. *Vata* plays an important role in the movement of energy as well as functioning of neural processes and brain activity. The aggravation affects the mental functioning leading to increased activity of the mind as well as difficulty in achieving relaxation in the mind. Continuous anxiety may result in the impairment of cognitive functions including *Dhi*, *Dhriti* and *Smriti*. *Dhi* is connected with the proper understanding of information that leads to excessive or illogical assessment of dangers. It is impossible to maintain psychological control due to the reduction of one's ability to control one's thoughts and feelings. The major functional imbalances associated with anxiety disorders are depicted in **Figure 1**.^[1-3]

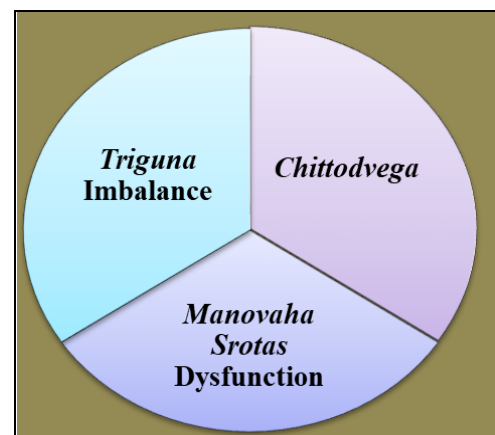


Figure 1: Major functional imbalances associated with anxiety disorders.

As mentioned in Figure *Triguna* imbalance, *Chittodvega*, *Manovaha Srotas* dysfunction are major imbalances associated with anxiety related disorders. According to Ayurveda, *Sattva* governs clarity and mental calmness as against the hyperactivity of *Rajas* that is indicative of distress, restlessness and constant cognitive activity. In conditions of anxiety, a decisive increase in the level of *Rajas* while *Sattva* predominates less can give rise to

such symptoms as racing thoughts, irritability and variations in emotions.

Chittodvega means emotional instability which includes disturbance of *Manas* results in the regular feeling of anxiety, restlessness, internal discomfort and palpitations, etc. These symptoms may be interpreted as the manifestations of the perturbation of *Vata* and changes in mental processes.

Manovaha Srotas dysfunction also play vital role in the pathogenesis of anxiety disorders. *Manovaha Srotas* may be considered channels which are responsible for mental functions, and in the case of anxiety, the functioning of these channels may be impaired. From Ayurvedic perspective when the channels do not function properly, it leads to the violation of the coordination of thoughts and responses on psychological level.^[4-6]

Tri-Gunas Imbalance

Besides *Vata* dysregulation, Ayurveda emphasizes the disturbance of the *Gunas* of the mind. *Rajas* predominance brings mental turmoil, restlessness and elevated emotional responsiveness. Excessive *Tamas* produces symptoms of heaviness, low initiative and indecisiveness.

Oja and Agni Imbalance

One more pivotal concept of Ayurveda is *Ojas* depletion, which is considered the vital element preserving one's stability, vitality and ability to resist stress and diseases.

Low *Ojas* manifests itself in fatigue and heightened vulnerability to emotions.

The damage to *Agni*, may lead to the imperfection of metabolism and production of *Ama*. It is generally believed that *Ama* gets stored up in the body, which leads to improper functioning of tissues and the whole body, in turn, has an impact on mental state. Their dysfunction is connected to symptoms like *Chinta*, *Bhaya* and lack of mental stability.^[5-7]

Anxiety and Brain Functional Changes; correlation of Ayurveda and Modern Aspects

- ✓ The imbalance of *Vata* is associated with decreased heart rate variability and autonomic dysfunction.
- ✓ *Ama* has been correlated with the increased level of some inflammatory markers like C-reactive protein.
- ✓ The depletion of *Ojas* is related to changes in brain derived neurotrophic factor and cortisol dysfunction.
- ✓ *Rajas Guan* imbalance can be correlated with heightened arousal and catecholamines.
- ✓ Imbalance of *Tamas Guan* can be correlated with reduced executive and cognitive abilities.
- ✓ *Manovaha Srotas Dushti* may also have connections with the altered GABA-ergic/serotonergic functions.^[6-9]

Sharir Rachana Aspects

According to *Sharir Rachana* aspect, anxiety can be elaborated with reference to the anatomical and structural aspects of *Mastishka*, *Shira*, *Hridaya*, *Indriya*, *Majja Dhatu* and *Srotas* as depicted in **Table 1**.

Table 1: Relevance of Sharir Rachana in Anxiety Disorders.

<i>Sharir Rachana</i>	Relevance in Anxiety Disorders
<i>Mastishka</i>	Its functional disturbance may manifest as mood alterations, impaired concentration and cognitive changes.
<i>Shira</i>	Disturbance in its functions contribute to neurological manifestations.
<i>Majja Dhatu</i>	Its impairment may be associated with weakness and disturbances in neurological functions.
<i>Manovaha Srotas</i>	Their dysfunction may manifest as <i>Chinta</i> , <i>Bhaya</i> , mental instability and other psychological disturbances.
<i>Indriya</i>	Their functional disturbance may contribute to altered sensory processing and emotional responses.

Ayurvedic Approaches for Functional Restoration

The Ayurvedic cognitive and adaptogenic approaches in the frameworks of *Medhya* include herbs such as *Brahmi*, *Ashwagandha* or *Jatamansi*. These herbs are used to achieve *Medha*, assure mental stability, and enhance the individual's ability to manage stress. *Medhya Rasayana* including *Withania somnifera* lowers the stress level and reduces serum cortisol.

Yoga and other non-pharmacological methods are also suitable for managing anxiety disorders. *Yoga* practice leads to the increase of GABA activity and thus improves inhibitory neurotransmission. *Yoga* and meditation improve heart rate variability, help to

decrease cortisol concentration and make changes in inflammatory markers.

Some Ayurvedic therapy like *Shirodhara* balances *Doshas*, improves mental strength and restores harmony of the *Manas*. *Shirodhara* also has been long used for relaxation purposes as well as calmness and stress regulation.^[7-10]

CONCLUSION

According to Ayurveda, there are various concepts relating to anxiety like *Chittodvega*, *Vata Prakopa*, *Triguna* imbalance, *Manovaha Srotas Dushti*, *Ojas* and *Agni*, which provide insight into anxiety. These concepts have similarities with modern parameters like autonomic

dysfunction, cortisol related changes, inflammatory changes, changes in neurotransmitters and cognitive dysfunction. *Sharir Rachana* provides insight into *Mastishka, Shira, Hridaya, Majja Dhatu* and *Srotas*. The Ayurvedic treatments used to treat anxiety include *Medhya Rasayana, Yoga*, meditation and *Shirodhara*, which can help to achieve mental stability and control stress.

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