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NISYAN (MEMORY DYSFUNCTION): INTEGRATING CLASSICAL UNANI CONCEPTS, LIFESTYLE DETERMINANTS OF MEMORY DISORDERS, AND MUQAWWI-E-HAFIZA(MEMORY ENHANCER) THERAPEUTICS

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Abstract: Memory dysfunction or memory disorders are now becoming a health problem that negatively impacts quality of life and functional independence. Nisyān in Unani medicine is a disorder in which memory, reasoning, and imagination become defective. The objective of this review is to give an integrative discussion on the Unani perspective of Nisyān, its pathophysiology, presentation, lifestyle factors, and treatment approach supported by recent scientific findings. A comprehensive literature search was undertaken using electronic databases, including PubMed, Google Scholar, Scopus, and ScienceDirect, to identify relevant English-language publications. Classical Unani literature was reviewed using authoritative texts, including *Al-Qanun fi'l-Tibb*, *Sharah Asbab*, *Tibb-e-Akbar*, *Zakheera Khwarzam Shahi*, *Khazain-ul-Advia*, and other standard Unani references. As per the classical literature, the Nisyān arises from derangements of Quwwat-e-Hafiza, Quwwat-e-Mufakkira, and Quwwat-e-Khayal mostly due to Su'-e-Mizaj of the brain. Both classical and modern literature indicate the role of modifiable lifestyle factors which includes poor dietary habits, digestion, sleep problems, inactivity, psychological distress, and metabolic disorders in causing memory dysfunction. Many Muqawwi-e-Hafiza drugs have shown antioxidant, neuroprotective, anti-inflammatory, and cognitive effects in experimental studies. However, evidence is inadequate for some formulations.

Index Terms - Nisyān, memory dysfunction, Unani medicine, Muqawwi-e-Hafiza, lifestyle determinants, cognitive impairment

I. INTRODUCTION:

Memory dysfunction comprises a spectrum of clinical manifestations that vary from subjective forgetfulness and mild cognitive impairment to severe neurodegenerative conditions. Evidence suggests that approximately 50–60% of older adults report subjective memory complaints, while mild cognitive impairment affects around 5.9% of the global older population. Furthermore, dementia affects more than 55 million individuals worldwide, highlighting the escalating public health burden of memory-related disorders and emphasizing the need for effective preventive and therapeutic strategies.(7)

Global burden of memory related disorders:
A systematic review published in 2020 estimated that approximately 6-8% of older adults experience significant memory problems, including various forms of amnesia associated with Alzheimer's disease and other dementias.(8)
In India, the prevalence of memory disorders, including amnesia, is a notable concern. A study conducted in 2021 found that cognitive impairment was present in about 15% of the elderly population, with memory loss being a significant symptom reported.(8)

II. CONCEPT OF MEMORY AND QUWWAT-E-HAFIZA:

Memory is the ability of the brain to receive, store, retain, and recall information whenever required. It is an essential cognitive function that enables learning, reasoning, decision-making, and adaptation to the surrounding environment.
Memory is not a single process, but consists of several interrelated stages of encoding, storing, retrieving and forgetting information. (9)
Ibn Sina in his Al-Qanun mentioned that faculty of memory (Quwwat-e-*Hafiza*) is one of the five internal perceptive faculties (*Hawaas-e-Khamsa Batina*) of the brain, governed by psychic faculty (Quwwat-e-Nafsaniyah). The faculty of memory (Quwwat-e-Hafiza) is responsible for preserving the meanings perceived by the estimative faculty (Quwwat-e-Wahima). *Quwwat-e-Hafiza* is responsible for retaining and recollecting experiences and knowledge. The humours (*Akhlat*), and the integrity of the (*Quwwat-e-Nafsaniyah*). He further states that the location of *Quwwat-e-Hafiza* is the posterior ventricle (*Batn-e-Mu'akhkhar*) of the brain, and impairment of this faculty results in forgetfulness (*Nisyan*). (2)

The faculty of memory (Quwwat-e-Hafiza) is responsible for preserving the meanings perceived by the estimative faculty (Quwwat-e-Wahima). In this sense, it serves as the repository or storehouse of the Wahima. The relationship between Quwwat-e-Hafiza and Quwwat-e-Wahima is analogous to the relationship between Khayal (the imaginative faculty) and the common sense (Hiss-e-Mushtarik). Some physicians also refer to Quwwat-e-Hafiza as Quwwat-e-Zakira (the faculty of recollection) because *dhikr* (recollection) refers to bringing forth from memory something that has been retained in the brain and expressing it.
Recollection (*Tadhakkur*) consists of two processes:

1.Perceiving again, at a later time, something that had been perceived previously.

2. Retaining that perception in the brain so that it can be recalled when required.

According to this view, recollection involves three successive functions:

1. **Quwwat-e-Mutakhayyila (Imaginative Faculty):** It retrieves and presents the stored sensory images from *Khayal* before the **Quwwat-e-Wahima**.

2. **Quwwat-e-Wahima (Estimative Faculty):** It derives and perceives the meanings associated with those images.

3. **Quwwat-e-Hafiza (Memory Faculty):** It preserves and stores those meanings for future recall.

Thus, the process of recollection (*Tadhakkur*) depends on the coordinated action of three faculties: **Quwwat-e-Mutakhayyila**, **Quwwat-e-Wahima**, and **Quwwat-e-Hafiza**.(22)

III. *NISYĀN* IN UNANI MEDICINE:

Definition of Nisyān:

The term *Nisyān* literally means forgetfulness. In Unani medicine, it refers to a disorder of the internal cognitive faculties (*Quwa-e-Batina*) in which a person becomes unable to retain, recall, or correctly recognize previously acquired knowledge and experiences. Classical Unani scholars considered *Nisyān* a disease of the brain (*Dimagh*) resulting from impairment of *Quwwat-e-Hafiza* and related internal faculties responsible for perception, thinking, and memory. Depending upon the faculty affected, the patient may forget familiar information, fail to recognize known objects, or experience errors in recollection and imagination. [4]

Types, Etiopathogenesis and Clinical Features of Nisyān: [1,3,4,5]

Classical Unani physicians classified *Nisyān* into three forms based on the internal cognitive faculty (*Quwwat-e-Batina*) predominantly affected: *Fasād-e-Zikr*, *Fasād-e-Fikr*, and *Fasād-e-Khayāl*. Although each type differs in its clinical presentation, all result from impaired function of the internal faculties responsible for memory, thinking, and imagination. The underlying pathology is usually attributed to *Su'-e-Mizaj* of the brain, particularly the predominance of abnormal coldness, moisture, or dryness, which interferes with the normal functioning of these faculties.

1. Fasād-e-Zikr :[5]

Fasād-e-Zikr refers to impairment of *Quwwat-e-Hafiza*, the faculty responsible for retaining and recalling previously acquired knowledge and experiences. In this condition, the memory becomes weak or defective, resulting in difficulty preserving information and recalling it when required. Consequently, the patient tends to forget recent events, conversations, or learned information despite having normal perception at the time of learning.

Fasād-e-Zikr primarily develops due to *Su'-e-Mizaj* of the posterior part of the brain (*Batn-e-Mu'akhkhar-e-Dimagh*). [4]

Two principal pathological states have been described: **Barid Ratab** (cold and moist temperament) and **Barid Yabis** (cold and dry temperament). In *Barid Ratab*, excessive coldness and moisture interfere with the proper retention of impressions in the brain, whereas in *Barid Yabis*, excessive dryness reduces the brain's ability to preserve and retrieve stored memories.

The condition may also arise secondary to disorders affecting the brain, such as cerebral weakness (*Za'f-e-Dimagh*), cerebral softening (*Talayyun-e-Dimagh*), advanced age, paralysis, syphilitic involvement of the brain, vascular obstruction, or excessive mental exertion and anxiety. These factors impair the normal function of *Quwwat-e-Hafiza*, ultimately leading to memory dysfunction.

Clinical Features:

Patients with *Barid Ratab* commonly present with:

- excessive sleep,
- heaviness of the head, particularly over the occipital region, and
- increased nasal or cranial secretions.

In contrast, *Barid Yabis* is characterized by :

- Insomnia,
- dryness of the nostrils,
- dryness of the throat and skin,
- difficulty in continuous speech, and
- progressive forgetfulness due to impaired retention and recollection.

2. Fasād-e-Fikr:

Fasād-e-Fikr results from dysfunction of *Quwwat-e-Mufakkira*, the faculty responsible for thinking, reasoning, and processing information. The patient becomes unable to organize previously acquired knowledge or derive logical conclusions from it, resulting in defective thinking and poor judgment.

This condition is mainly caused by *Su-e-Mizaj Barid Ratab* affecting the brain, although *Su-e-Mizaj Barid Yabis* may also disturb the normal function of the thinking faculty.

Clinical Features:

- Patients exhibit impaired reasoning,
- mental confusion,
- inability to solve problems, and
- reduced intellectual performance.

3. Fasād-e-Khayāl:

Fasād-e-Khayāl is caused by impairment of *Quwwat-e-Khayāl*, its location is *muqaddam dimagh* the faculty responsible for preserving and reproducing sensory images after they are no longer perceived by the external senses. The patient loses the ability to mentally reproduce previously perceived images or experiences, leading to defective imagination and visualization.

This condition is usually associated with derangement of the brain's temperament, particularly excessive dryness, although excessive moisture may also contribute. Unlike *Fasād-e-Zikr*, which primarily affects the retention of meanings, *Fasād-e-Khayāl* predominantly interferes with the preservation and recall of sensory images.

Clinical features:

- Patients may experience poor dream recall,
- inability to mentally visualize familiar persons or objects,
- incomplete recollection of previously perceived images,
- difficulty recalling visual experiences after they disappear from sight.

Principles of Management

The management of *Nisyān* in Unani medicine is based on a holistic approach aimed at restoring the normal function of the brain and strengthening the cognitive faculties. The primary principles include

- elimination of the underlying cause (*Izala-e-Sabab*),
- correction of the altered temperament of the brain (*Islah-e-Mizaj*),
- evacuation of morbid humours when indicated (*Tanqiya*), and
- strengthening of the brain and memory faculties through *Muqawwi-e-Dimagh* and *Muqawwi-e-Hafiza* drugs.

IV. RISK FACTORS AND LIFESTYLE DETERMINANTS OF NISYAN AND MEMORY DISORDERS:

Lifestyle plays a vital role in maintaining cognitive health. Healthy dietary practices, adequate sleep, regular physical activity, avoidance of tobacco and alcohol, cognitive engagement, and effective stress management contribute to preserving memory, whereas disturbances in these factors increase the risk of cognitive impairment. These observations closely parallel the Unani concept of maintaining health through *Asbāb-e-Sitta Zarūriyah*.

According to Ibn Sina, maintenance of normal digestion is essential for preserving the temperament of the body and brain. He explained that when *Quwwat-e-Hazima* fails to digest a *Khilt* adequately, abnormal humours accumulate, leading to diminution of *Hararat-e-Ghariziyah*. This results in generalized coldness and eventually produces *Su'-e-Mizaj Barid* of the brain, weakening its cognitive faculties, particularly *Quwwat-e-Hafiza*, and predisposing the individual to *Nisyān*. [(2)]

Ibn Sina also regarded *Ifrat-e-Baidari* (excessive wakefulness) as an important cause of memory impairment. He stated that prolonged wakefulness induces *Yubusat-e-Dimagh*, leading to *Su'-e-Mizaj Yabis*, *Za'f-e-Dimagh*, and *Ikhtilāt-e-'Aql*. Consequently, the normal functions of memory and intellect become impaired. This concept is consistent with current evidence that chronic sleep deprivation adversely affects memory consolidation and cognitive performance. [2]

Risk factors in early life (education), midlife (hypertension, obesity, hearing loss, traumatic brain injury, and alcohol misuse) and later life (smoking, depression, physical inactivity, social isolation, diabetes, and air pollution) can contribute to increased dementia risk. [13]

Evidence from systematic reviews and umbrella reviews has identified several modifiable factors associated with cognitive impairment and dementia. These include:

- Low educational attainment
- Physical inactivity
- Smoking
- Excessive alcohol consumption
- Unhealthy dietary habits
- Sleep disturbances
- Obesity and metabolic disorders
- Depression and chronic psychological stress
- Reduced cognitive and social engagement
- Hypertension and diabetes mellitus [11]

A recent community-based study from Punjab, North India, also identified advanced age, illiteracy, unemployment, and smoking as important determinants of cognitive impairment, emphasizing the need for preventive strategies targeting modifiable lifestyle factors. [10]

4.1 Sleep Disturbance:

Adequate sleep is essential for memory consolidation and clearance of neurotoxic metabolites through the glymphatic system. Chronic sleep deprivation impairs learning, attention, and memory, increasing the risk of memory dysfunction. In Unani medicine, balanced sleep (*Naum wa Yaqza*) is considered essential for maintaining the health of the brain and strengthening *Quwwat-e-Hafiza*. [12]

4.2 Dietary Habits

Diet significantly influences memory through its effects on oxidative stress, inflammation, and neuronal function. Diets rich in fruits, vegetables, whole grains, and omega-3 fatty acids have been associated with better cognitive performance, whereas excessive intake of processed foods and refined sugars may accelerate memory decline. Mediterranean diet (high intake of vegetables, legumes, fruits, nuts, cereals, and olive oil; low intake of saturated lipids and meat) or the similar Nordic diet, rather than individual nutrients, which might reduce cognitive decline and dementia. [13]

4.3 Physical Inactivity

Regular physical activity promotes cerebral blood flow, enhances neuroplasticity, and stimulates the release of brain-derived neurotrophic factor (BDNF), which supports memory formation. Conversely, sedentary behaviour has been linked to impaired memory performance and an increased risk of age-related memory dysfunction. [13]

4.4 Chronic Psychological Stress

Persistent stress elevates cortisol levels, which can adversely affect hippocampal function and impair memory processes. Stress-induced neuroinflammation and reduced synaptic plasticity further contribute to memory dysfunction. During stress there is activation of the hypothalamic-pituitary-adrenal (HPA) axis, culminating in the production of glucocorticoids. Glucocorticoids can easily access the brain, where they bind to receptors and influence the brain and behaviour. (14)

4.5 Obesity and Metabolic Disorders

Obesity, insulin resistance, diabetes, and metabolic disorders contribute to neuroinflammation, oxidative stress, and vascular dysfunction, all of which adversely affect memory. (13)

4.6 Excessive Digital Screen Exposure

Prolonged screen time and excessive smartphone use are associated with reduced attention span, sleep disturbances, and impaired memory performance. Although evidence is still evolving, digital overuse is increasingly recognized as a modifiable lifestyle factor affecting cognitive and memory health. (15)

4.7 Smoking and Alcohol Consumption

Smoking and excessive alcohol intake accelerate oxidative stress, neuronal damage, and cerebrovascular dysfunction, thereby increasing the risk of memory decline. (13)

5. MUQAWWI-E-HAFIZA THERAPEUTICS IN THE MANAGEMENT OF NISYĀN

5.1 Mufrad Adviya (Single Drugs)

Several single drugs have been described in classical Unani literature as *Muqawwi-e-Hafiza* and *Muqawwi-e-Dimagh*. Contemporary pharmacological studies have demonstrated that many of these possess antioxidant, anti-inflammatory, neuroprotective, and cognition-enhancing properties, supporting their traditional use in memory disorders.

1. Asgand (*Withania somnifera*):

Asgand (*Withania somnifera*) is described in Unani medicine as a Muqawwi(6)

Studies have shown that rats on administration of aqueous extracts of W. somnifera had elevated ACh levels and increased choline acetyltransferase (ChAT) activity, which may account for some of the factors that improve memory and cognitive function. Several clinical trials provided evidence for the cognitive potential of ashwagandha extract in alleviating memory impairment in propoxur-treated rats, improving performance in cognitive tasks, cognitive flexibility, psychomotor speed, visual memory, reaction time, stress response, and executive function. In a double-blind, clinical study, patients with mild cognitive impairment (MCI) were administered a 100% aqueous extract of Withania roots for eight weeks. This treatment improved the speed of information processing, immediate and general memory, executive functioning, and attention. (16)

2. Brahmi (*Centella asiatica* L.):

Barhami Booti (*Centella asiatica* L.) is a drug which possess Muqawwi-e-Dimagh, Muqawwi-e-Hafiza, and Muqawwi-e-Asab actions(6)

In a clinical trial, the efficacy of 70% ethanolic extract of C. asiatica on generalized anxiety disorder was evaluated. About 33 volunteers received a fixed dose of 500 mg per capsule, taken twice daily for 60 days. The results demonstrated a significant reduction in anxiety-related disorders, stress, and its correlated depression. (16)

3. Asl-us-Soos /Mulethi (*Glycyrrhiza glabra*):

Asl-us-soos (*Glycyrrhiza glabra*) has been described as Muqawwi-e-Asaab and Munzij (6)

The effects of G. glabra root extract on learning and memory were investigated in mice by conducting neurobehavioral studies such as an Elevated Plus maze and a Morris water maze. Orally administered 150 mg/kg dose of G. glabra aqueous root extract for 7 days alleviated memory and learning impairment. Furthermore, this extract significantly reversed the scopolamine induced and diazepam-

induced amnesia (Dhingra et al., 2004). Liquiritigenin (LIQ), a bioactive compound from licorice roots effectively inhibited the apoptosis in glutamate-treated hippocampal neuronal cells in mice by preventing lipid peroxidation, Ca2+ influx, and intracellular ROS production, thus exhibiting a strong neuroprotective effect. (16)

4. Amla (*Phyllanthus emblica):*

Amla (*Phyllanthus emblica)* strengthens memory (*Muqawwi-e-Hafiza*) and acts as a brain tonic (*Muqawwi-e-Dimagh*).(6)

The amount of vitamin C is reported to be the highest (478.56 mg/100 ml) in Amla compared to other citrus fruits. Amla, being abundant in Vitamin C, contributes to enhanced memory and has a calming effect and anti-cholinesterase activity. The pharmaceutical properties of this herb include nootropic, antioxidant, antianxiety, antistress, anticancer, adaptogenic, immunomodulatory, anti-inflammatory, antimicrobial, and anti diabetic activity. (16)

5. Ustukhudus *(Lavandula stoechas L.):*

Ustukhudus strengthens brain (Muqawwi-e-Dimagh), Cleanses/ detoxify brain (munaqqi-e-dimagh).(6)

The review by Ahamad et al. reveals that essential oils, flavonoids, terpenes, and phenolic compounds are present in Lavandula stoechas which show antioxidant, anti-inflammatory, and neuroprotective effects. Experimental studies reported by the authors reveal that this drug may be used for the protection of neurons as well as for the management of neurodegenerative diseases including anxiety and insomnia. These pharmacological properties provide scientific support for its traditional use as a Muqawwi-e-Dimagh, although direct clinical evidence for memory enhancement remains limited. (19)

6. Akhrot (*Juglans regia* L.):

Akhrot is regarded as *Muqawwi-e-Dimagh* (brain tonic), *Muqawwi-e-Hafiza* (memory enhancer), *Muqawwi-e-Aasab* (nervine tonic), and *Munqqi-e-Dimagh* (brain cleanser). (6)

The neuroprotective effects of *J. regia*, commonly known as walnut, have been extensively investigated through various studies. The results of these studies suggest that the consumption of *J. regia* or its active compounds, including polyphenols, flavonoids, and omega-3 fatty acids, can help in the prevention and treatment of neurological disorders such as Alzheimer's disease, Parkinson's disease, depression, anxiety, epilepsy, and pain by various underlying mechanisms, for instance, anti-oxidant, anti-inflammatory, and anti-apoptotic effects. (20)

7. Kundur *(Boswellia serrata Roxb. ex Colebr.):*

Kundur is considered as Muqawwi (6)

In an experimental study conducted on streptozotocin-induced diabetic rats, Gomaa et al. showed that gum from Boswellia serrata containing high levels of polyphenols greatly enhanced cognitive function and prevented memory deficits. Neuroprotective action was mediated through inhibition of glycogen synthase kinase-3β (GSK-3β), reduction of oxidative stress and pro-inflammatory cytokines, and enhancement of insulin signaling. Therefore, B. serrata may be effective for prevention of cognitive dysfunction; nevertheless, further clinical trials in humans are needed. (21)

5.2 Murakkab Adviya (Compound Formulations)

Classical Unani physicians recommended several compound formulations for strengthening memory and improving cerebral functions. These formulations act by correcting *Su'-e-Mizaj*, strengthening the brain, and enhancing the function of *Quwwat-e-Hafiza*.

The commonly described Unani formulations used for strengthening memory and cognitive function include:

- **Majoon Baladur** – *Muqawwi-e-Hafiza, Muqawwi-e-Dimagh*
- **Majoon Najah** – *Muqawwi-e-Hafiza, Muqawwi-e-Aasab*
- **Majoon Brahmi** – *Muqawwi-e-Dimagh, Muqawwi-e-Hafiza*
- **Majoon Vaj** – *Muqawwi-e-Hafiza*
- **Itrifal Sagheer** – *Muqawwi-e-Dimagh*

- **Itrifal Kabir** – *Muqawwi-e-Dimagh, Musaffi-e-Dimagh*
- **Khamira Gaozaban Ambari Jawaharwala** – *Muqawwi-e-Qalb, Muqawwi-e-Dimagh, Muqawwi-e-Aasab*

These formulations are traditionally prescribed in Unani medicine to enhance cognitive functions through actions such as strengthening memory (*Muqawwi-e-Hafiza*), nourishing the brain (*Muqawwi-e-Dimagh*), supporting the nervous system (*Muqawwi-e-Aasab*), cleansing the brain (*Musaffi-e-Dimagh*), and improving cardiac function (*Muqawwi-e-Qalb*), thereby contributing to overall mental and neurological health. [23]

IV. RESULTS AND DISCUSSION

This review demonstrates that Nisyān, as mentioned in the classical Unani texts, represents a comprehensive concept of memory loss, which implies disruption of Quwwat-e-Hafiza (memory), Quwwat-e-Mufakkira (thinking), and Quwwat-e-Khayal (imagination). Classical Unani physicians have attributed the development of Nisyān mostly to Su'-e-Mizaj of the brain owing to humoral imbalances, impaired digestive processes, and derangement of cerebral temperaments. Moreover, the classical classification of Nisyān into Fasad-e-Zikr, Fasad-e-Fikr, and Fasad-e-Khayal has a striking similarity to the various domains of cognitive dysfunction according to modern medicine. It is worth noting that both classical and contemporary researches have established that certain modifiable risk factors like unhealthy diet, disturbed sleep, physical inactivity, psychological stress, and metabolic dysregulations contribute significantly to the development of memory problems. This means that there is a strong conceptual correlation between the principle of Asbab-e-Sitta Zarooriyah of classical Unani medicine and modern ideas concerning the impact of lifestyle on cognitive dysfunction.

This review has revealed that the therapy of Nisyān in Unani medicine is not merely symptomatic, but includes correction of Su'-e-Mizaj, elimination of etiological agents, and augmentation of cognitive functions by means of Muqawwi-e-Hafiza and Muqawwi-e-Dimagh drugs. As can be seen from the scientific evidence, numerous medicinal plants, which are traditionally used in the treatment of memory dysfunction possess antioxidant, anti-inflammatory, neuroprotective, cholinergic-modulating and cognition enhancing activity, which confirms their traditional application. At the same time, the evidence related to some complex formulations is limited, and most of the evidence comes from experimental studies, and no clinical studies are available. Therefore, based on the literature review, it appears that an approach based on Unani medicine combined with the lifestyle modification can be helpful for the prevention and treatment of memory dysfunction. There is an urgent need for standardization of the formulations and conduct of RCTs to prove their efficacy and implement them into practice.

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