IAMJ

INTERNATIONAL
AYURVEDIC
MEDICAL JOURNAL

Review Article ISSN: 2320 5091 Impact Factor: 5.344

ALZHEIMER'S DISEASE - UNDERSTANDING SIDDHA MEDICINE LOOMS IN SPECIAL REFERENCE WITH MATA A̲LIVU

Jenefa Rose Priya. T

Assistant Professor, Department of Sattam Sarntha Maruthuvam Nanju Maruthuvam, Maria Siddha Medical College and Hospital, Thiruvattaru, Tamil Nadu 629177, India

Corresponding Author: dr.jenefa@gmail.com

https://doi.org/10.46607/iamj06p4062020

(Published online: September 2020)

Open Access

Article Received:07/09/2020 - **Peer Reviewed:**26/09/2020 - **Accepted for Publication:**26/09/2020

Check for updates

ABSTRACT

Alzheimer's disease (AD), an unceasing progressive neurological disorder of the brain, sorted below the umbrella term dementia named by German Dr. Aloes Alzheimer in 1906. AD is the most typical drawback of aged, found to mount worldwide, poignant with an approximate of thirty million people. The chief common reason behind AD lands up in nuisance with recollection, thoughts, orientation and behaviour that destruct and shrinks the brain. Presently several disease modifying agents, anticholinesterases outline the foremost dwell among the treatment of AD. However, these medications tend to slower the ill health progression. Further researches are going on rapidly for better manifold innovative cure target. In order to persuade them, this systemic review is carried with the objective to share the responsibility of Siddha's insight in comprehending the symptoms (*Kuṟikuṇaṅkaḷ*), and traditional healing (*Maruttuvam)* rendering integrable pertinence to manage AD. As Siddha Medicine, a foremost traditional medicine of India describes the use of a wide range of medical intervention of assorted diseases. This ample paradigm information could be used for discrete medicine crusade progression, thereby providing newer purposeful edge for AD.

Keywords: Alzheimer's, *Mata A̲livu*, *Kuṟikuṇaṅkaḷ*, *Maruttuvam*, Siddha

1. INTRODUCTION

Alzheimer's disease (AD)is a persistent neurodegenerative disease and a progressive inevitable loss of cognitive utility allied with the existence of senile plaques in the hippocampal area of the brain, that usually starts in late middle or in elder age slowly and worsens over time [1-2]. Siddha Medicine justifies AD as *Mata Aḻivu, (Matāttiyam* or *Matukēṭu)* a disorder caused due to destroying or deterioration of the *Udal Tātukkaḷ* (body basic tissues) especially *Koḻuppu* (Fat) *tātu*, as the human brain is nearly 60% fat and *Vintunātam* & *Kāma nīr* (Male or female reproductive tissue & sexual arousal secretions like Bartholin's glands), as epidemiologic studies illustrate the age-related failure of sex steroid hormones in both genders has bigger risk for AD. [3 - 5] There were just about 29.8 million people with AD worldwide in 2015[1]. On 2017 Alzheimer's Statistics - Globally, nearly 44 million people have Alzheimer's or a related dementia. The figure of the disease is projected to attain 106.8 million, universal by the year 2050. Consequently, the disease is a mounting public health concern with major socioeconomic burden as 1 of 4 people has been diagnosed [6-7]. It most often begins over 65 years and older affecting 6% of people, though 4% to 5% of cases are early onset. The key cause of AD is due to genetic heritability (70%), reduced synthesis of the neurotransmitter acetylcholine, extracellular amyloid beta deposits, tau protein abnormalities, neurofibrillary tangles inside nerve cell bodies, deprived functioning of the blood–brain barrier, disrupted cellular homeostasis of bio metals such as ionic copper, iron, and zinc [1]. *Mata aḻivu,* said in Siddha is caused due to high intake of meat, high-calorie intake, heavy smoking and excess alcohol consumption [3] [7] which are vastly accepted now. Risk factors of AD includes history of head injuries, depression, hypertension, decreased regional cerebral blood flow, stress, obesity, diabetes, saturated fatty acids systemic markers of the innate immune system, air pollution etc [1][7-8].

2. Methods

This is a systemic review with an extensive search on traditional authoritative text books of Siddha and PubMed, Google Scholar data bases were explored for research papers, articles using "Alzheimer's disease", "Herbal medicine", "Traditional treatment" as a major search criterion. They were selectively integrated and analysed to evolve the aforementioned pertinence of AD.

3.1. Symptoms (*Kuṟikuṇaṅkaḷ*)

The monitory symptoms (*Kuṟikuṇaṅkaḷ*) of *Mata aḻivu* in Siddha is correlated with AD through scientific validation and are depicted below:

Table1: Symptoms of *Mata Aḻivu* vs. Alzheimer's

Siddha Science -*Mata aḻivu* [3]	**Scientific validation – Alzheimer's**
Cōrvu (Debility)	Fatigue [9]
Malanīr naḻukal (Incontinence of bowel & bladder)	Lose bladder and bowel control [10]
Kaṭumaiyāṉa nāvaṟaṭci (Increased dryness of tongue)	Xerostomia (Dry Mouth), dehydration [11]
Veppa curam (Hyperpyrexia)	Fever due to heat stroke [12]
Kuḷir curam (fever with chills)	Hyperpyrexia and chills [12]
Uṇavil veṟuppu (Anorexia)	Appetite loss and malnutrition [13]
Atika nāēvu (Severe pain) in chest, vertex, shoulder, ribs, genital organs.	Acute or chronic pain which may be neuropathic or nociceptive [14].
Naṭuṅkal (Tremor or shivering)	Majority of Essential Tremor in dementia cases had clinical diagnoses of AD [15].
Mārāṭaippu (Chest congestion)	Oropharyngeal dysphagia [16] (choking on swallowing)
Kaṇ iruṭkam'mal (Poor vision)	Loss of visual acuity, colour vision and visual fields, changes in pupillary response to mydriatics, defects in fixation and in smooth and saccadic eye movements, changes in contrast sensitivity and in visual evoked potentials and disturbances of complex visual functions [17].

doi:10.46607/iamj06p4062020 | IAMJ August - September 2020 | www.iamj.in

Irumal (Cough), *Iraippu* (Asthma)	Chronic obstructive pulmonary disease. People with asthma had higher odds of getting dementia [18][19].
Tūkka kēṭu (Impaired sleep)	Sleep disorders [20]
Viyarvai (Sweating)	Impaired sweating more susceptible to heat stress [21].
Malakaṭṭu (Infrequent bowel movements)	Constipation [22]
Vīkkam (Swelling)	Inflammation in pathologically vulnerable regions of AD brain. In the periphery, degenerating tissue and the deposition of highly insoluble abnormal materials are classical stimulants of inflammation [23].
Aṟivukēṭu (Amnesia)	Cognitive dysfunction with disorientation and memory impairment [24]
Piralāpam (Mental illness)	Schizophrenia with delusions and hallucinations, cognitive deficit, personality and behaviour changes [24 – 25].
Vānti (Vomiting)	Emesis [11]
Mārpil caṅkaṭam (Tightness or discomfort of chest)	Cardiovascular diseases namely auricular fibrillation, ischemic heart disease and cardiac failure [26].
'Mayakkam (Faint)	Dizziness such as vertigo, pre syncope and fall [12][27].
Keṭṭa kaṉavu (Bad dreams)	Rapid eye movement sleep disorder might be an early indicator of dementia. This rare dream disorder cause weird violent dreams where victims scream, kick and thrash in sleep, or even jumps out of bed in wrath [28].
Mūḷai vaṟaṭci(May be Brain atrophy)	Decreased volumes of grey and white matter were consistently found with loss of neurons and synapses. And brain atrophy due to enlarged ventricles with increased Cerebrospinal fluid [29].

3.2. Medications (*Maruttuvam*) in Siddha: The primordial symptoms of AD and *Mata aḻivu* are depicted above in Table -1. Understanding the symptomatology and the underlying causes, the possible medications in Siddha Medicine is to be said.

3.2.1. Food thy medicine: *Cattuva kuṇam* foods are advisable. It includes: *Campā* (*Sambha)* types of rice, *Triticum sps*. (*Kōtumai*), millets (*Ciṟutiṉai*), *Vigna mungo* (*Uḷuntu*), *Vigna radiata* (*Pācippayaṟu*), *Phoenix dactylifera* (*Pērīccu*), spices like *Crocus sativus* (*Kuṅkumappū*), *Syzygium aromaticum* (*Kirāmpu*), *Elettaria cardamomum* (*Ēlam*), *Myristica fragrans* (Nutmeg & mace; *Jātikkāy* & *Jātipattiri*), sesame oil (*Nalleṇṇey*), coconut oil (*Tēṅkāyeṇṇey*), cow milk (*Pacupāl*), cow curd (*Pacutayir*), cow butter (*Pacuveṇṇey*), cow ghee (*Pacuney*), *Coriandrum sativum (Kottumalli), Trigonella foenumgraecum* (*Ventayam*) *Solanum nigrum* (*Maṇattakkāḷi*), honey (*Tēṉ*), tender coconut (*Iḷanīr*) etc [30].

3.2.2. Enhancers for the vitality of the *udal tātukkaḷ* (basic tissues): Siddha traditional medicines *Pūraṇa cantirāētayam, Tirikaṭukātimaṇṭuram;* preparations primed from *Ayam* (Fe), *Eḥku* (Steel), *Kāntam* (Magnetic oxide of iron), *Veḷḷi* (Ag), *Poṉ* (Au), *Muttu paṟpam* (Calcinated pearl),*Pavaḷa paṟpam* (Calcinated Emerald), *Withania somnifera (Amukkirākiḻaṅku*) root preparations [3].

3.2.3. For Memory loss, neurocognitive disorders: *Thaipāl* (human milk) oil – *Talai muḻukku* (anointing of head), preparation like *Pirami (Bacopa monnieri) ney, Vallārai (Centella asiatica) ney*. Single drugs - *Mañcaḷ (Curcuma longa), Vāluḷuvai (Celastrus paniculatus), Pūṇaikkāli* (*Mucuna pruriens*) seeds, *Uḷunthu* (*Vigna mungo*) seeds etc [3] [31- 33]

3.2.4. For mental illness:

1. *Mucuṟumuṭṭai pal* (egg of *Formica smaragdina* – Red ant) milk for *Naciyam* (instillation of nasal drops) and *Tuvālai* (embrocation).
2. *Talai muḻukku* (head anoint) from the oil prepared of *Vallārai* (*Centella asiatica*) leaves*, Akattikkīrai (Sesbania grandiflora*) leaves and *Veṭṭivēr (Vetiveria zizanioides*) root.
3. *Elumiccai* (*Citrus lemon*) juice *Thalai muḻukku* (head anoint).
4. Siddha preparations *Vilvātitailam, Ilakucantaṇātitailam, Ciṟucantaṇātitailam, Araikkīraivitaitailam* can be used as external application (unction).

doi:10.46607/iamj06p4062020 | IAMJ August - September 2020 | www.iamj.in

5. Paste of leaves of *Vallārai (Centella asiatica*) and *mucumucukkai (Mukia maderaspatana*) are used for *Tappaḷam* (smearing /rubbing or anointing oil) on head [3][33]

3.2.5. For occurrence of falls, dizziness:

1. Internal medications: *Vilvātiiḷakam*; decoction made from *karuṅkākkaṇam* (*Clitoria ternatea*), *pirami* (*Bacopa monnieri*), *naṉṉāri* (*Hemidesmus indicus*) root, *catāvēri* (*Asparagus racemosus*) root and *akattikkīrai* (*Sesbania grandiflora*) leaves.
2. External medications: *Navaccāraākkiraṇam* (powdered nasal insufflations), *Ālakālaviṭatailam* (liquid nasal insufflations), nasal insufflations prepared from bile (*Piccu*) of animals etc [3].

3.2.6. Yōkācaṉam (Yoga)[3]: *Pirāṇāyāmam* (Breathing exercise) with chanting followed by *Patmācaṉam* (lotus pose), *uṭkaṭṭācaṉam* (chair pose), *vīrācaṉam* (hero pose), *puyaṅkācaṉam* (cobra pose), *atōmukacuvāṉacaṉam* (dog pose), *talācaṉam* (mountain pose), *uṭṭaṉācaṉam* (forward bending pose), *carvāṅkacaṇam* (shoulder stand pose), *cavācaṉam* (corpse pose) etc. Possible postures can be made to practice with accurate assistance.

3.2.7. Tāekkaṇam (Physical manipulation unlike massage) with *varmam* manipulation: By applying oil with stimulation of *Varmam* points by authenticated experts can be done. The *Varmam* points include: *Piṭarikālam, cīṟuṅkolli, koṇṭaikolli, chunnampukālam, tilartakālam, pālakālam, soondikālam, puruvakālam, patchikālam, kannaadikālam, uthiraadangal, kathirkamakālam, anna kālam, sakthivarmam, natukuvarmam, eanthikālam, veeradangal, viruthi, uppukkuttri, mannai, nattalnervarmam, ullankaivellai, pozhivarmam, saramudichu, poigai* and *porchai*[4][31][34].

4. DISCUSSION AND CONCLUSION

Alzheimer's is an irretrievable, intensifying neurodegenerative dysfunction characterized by cruel reminiscence failure (*Aṟivukēṭu)* with strange behaviour, individuality change *(Piralāpam)* and dwindles in cognitive function whose signs and symptoms delineate *Mata aḷivu* of Siddha. Generally, a healthy diet should defend, revitalize and renew people psychological and somatic, making humans faster, most accurate and well sustained. Siddha describes *Cattuva* foods (3.2.1) which balances three humours and basic tissues, thus has the ability to nutriment and adds strong life to lifetime rather than existence. Further *Cattuva* foods strengthen one's character of renunciation (*Cattuva kuṇam*) by making one self-restricted, self-moral, envious in cause and not in effect, serenity, brave, judicious, immense, daring, skilful, forbearing, religious, optimistic, devoted, accomplished and superior in modesty, intellect, wisdom, calm, gives long life expectancy and therefore improving mental behaviour [35]. Thus, these *Cattuva* foods can lessen the circumstances of high-calorie intake like meat, saturated fatty acids rich diet. They also improve natural immunity. Character of renunciation gives good conduct and purity in mind so that avoidance of smoking and excess alcohol and beware of environmental strategies helps preventing people from dangerous metabolic diseases and pollution hazards which are proclaimed as the one of the fewer causes of AD. Enhancing the vitality is done by unique preparations of Siddha like *paṟpam*, *centūram*, *cuṇṇam*, *kaṭṭu* and *pataṅkam* which are called as life-saving and miracle medicines. Most of the medicines made from the above category (3.2.2) were found to contain nano particles [36]. These nano particles formulations were able to encapsulate molecules with therapeutic value, targeting specific transport processes in the brain vasculature through blood brain barrier and target appropriate component of the brain for the regenerative processes [37].Further, many Siddha plants (3.2.3) are found to have anti-amyloidogenic, anti-inflammatory, anti-cholinesterase, hypolipidemic, hypoglycaemic and antioxidant properties fighting against AD. One among them is the rhizome of *Curcuma longa* (*Mañcaḷ*) which has got major active constituent Curcumin, found to cross the blood–brain barrier and increase post-synaptic density-95 in brain by decreasing formation of amyloid beta fibrils, chemokines and pro-inflammatory cytokines. They also purge away the existent copper and iron chelation and improve the cognition process. Interestingly, turmeric being the extensively used spice of India makes AD much lower prevalence in India than other countries. Bioavailability

doi:10.46607/iamj06p4062020 | IAMJ August - September 2020 | www.iamj.in

could be possibly not a problem for Indians because it is pooled with oil in cooking [38] [39]. Another drug is the root of *Amukkura* (*Withania somnifera*) on recent review is identified to have 18 with anolides with neuro defensive effect. They tend to regenerate damaged neurons and synapses and reverse the damage to the hippocampus and cortex by diminishing neuronal process atrophy and recover cognitive deficit in a dose-dependent manner on oral administration in mice. They have anti-inflammatory, antioxidant properties and inhibit amyloid beta, calcium and neurotransmitter acetyl choline and finally lessen the cell death [39]. Studies also reveal that Siddha's magical herb *Pirami* (*Bacopa monnieri*) have active constituents Bacosides which are supposed to repair damage neurons by enhancing kinase activity and neuronal synthesis linked with the restoration of synaptic activity, thus improving nerve impulse transmission. They defend neurons from beta-amyloid induced cell death by restraining the cellular acetyl cholinesterase activity and also shows both reducing and lipid peroxidation inhibitory activities. It is a potential cognitive enhancer and neuro-protectant against AD. Further *Brahmi*, in Siddha is up taken chiefly in the form of decoction, powder and as *ney* (ghee). Adding to it, a study says some of the chemical constituents of *Bacopa monnieri* are lipophilic. This means they can combine with or dissolve in lipids giving them the ability to cross the blood-brain barrier [40 -42].

One more, the leaves of *Vallārai* (*Centella asiatica*) extract has bioactive triterpenes that include Asiaticoside, Asiatic acid, Madecassoside and Madecassic acid which are found to diminish the deposition of beta-amyloid in hippocampus and improve behavioural deficits of mice. [43].Further intranasal administration as nasal drops/ nasal insufflations (3.2.4) (3.2.5) used in Siddha medication is a non-invasive route that offers numerous benefits for drug delivery into the Central nervous system (CNS). This delivery is rapid as the drug bypasses the blood - brain barrier and directly targets the CNS, thereby perking up better recovery in AD and also reduces systemic exposure and side effects [2].The use of medicated oils (herbal drugs cooked in four parts oil and 16 parts water over a low flame until all of the water evaporates) for AD as in Siddha external application by anoint (or unction) as in *Thappalam, Thalai muluku* and *Thuvalai* (embrocation) (3.2.3) (3.2.4) is made by pouring the oil on the head particularly in forehead or all over the body ensures the transport of lipophilic and lipid-soluble molecules across the blood - brain barrier, which are supposed to improve the neuronal deficient. Even though systematic studies concerning the permeation of the herbal components into the CNS through trans - cranial oleation therapies are lacking, recent work says the possibility of endothelial cells to facilitate the entry of the solutes through the frontal lobe and prefrontal cortex [2][3].Massage (*Tāekkaṇam*) (3.2.7) in AD can bring out significant brain functional activation changes with increased cerebral blood flow. They reduce the stress-related serum cortisol, arginine, vasopressin and salivary stress protein chromogranin A levels with concomitant increases in circulating lymphocytes and regional cerebral blood flow. It is alluring to contemplate that, in addition to the above-mentioned hormonal changes; application of medicated oil followed by a gentle massage could relax the tight junctions between endothelial cells and facilitate the entry of solutes and other components into the CNS [2].Yoga and meditation (3.2.6) are intellect workout for the brain which includes six traits namely respiration, locomotion, pose, chant, visualization and attentiveness thus regenerate oneself physically and mentally as like kindling brain plasticity preferably needed in AD. The poses also give rejuvenation, increase suppleness, reduce obesity, depression and activate blood distribution along the body, mainly in all glandular and internal organs. Further, the patients can obtain the movements on invariable recurrence and make them feel unacquainted of learning[3]. *Varmam* is the meeting points of muscles, nerves, joints and skin including hair roots which are the places of flow of the vital energy *Pirāṇaṉ* (life force or *Vātam*). Huddles in the spread of *Pirāṇaṉ* or the *Vāci* is recovered on suitable pressure by manipulation which improvise the relation of five sensory organs with brain cells, increases memory power, stabilize oxygen level in tissues, maintain body temperature, strengthen optic nerves, reduce mental illness, dementia and insomnia [3][31][34]. This ability of implied erudition can be used as a preliminary summit in non-

pharmacologic intervention of AD. Hence it is concluded that both the external and internal medications in Siddha can reinforce the restorative armoury of AD when perk up on future experimental outcome in regard with the inhibition of beta-amyloid plaques and regenerating newer neurons in brain.

REFERENCES

1. Alzheimer's disease. [Internet]. en.wikipedia.org.2018 [cited 02 July 2018]. Available from https://en.wikipedia.org/wiki/Alzheimer's Disease
2. Rao, R. V., Descamps, O., John, V., & Bredesen, D. E. (2012). Ayurvedic medicinal plants for Alzheimer's disease: a review. *Alzheimer's Research & Therapy*, *4*(3), 22. http://doi.org/10.1186/alzrt125
3. Dr. R. Thiyagarajan L.I.M. Siddha *Maruthuvam – Sirappu*; 3rd ed., Dep. Of Indian Medicine and Homeopathy, Chennai, 2008; pp.3-55.
4. Chang CY, Ke DS, Chen JY. Essential fatty acids and human brain. Acta Neurol Taiwan. 2009 Dec; 18(4):231-41. Review. PMID: 20329590
5. Rena Li, Meharvan Singh. Sex Differences in Cognitive Impairment and Alzheimer's Disease. Frontiers in neuroendocrinology. 2014 Aug:; 35(3): 385 – 403. PMCID: PMC4087048
6. Alzheimer's Statistics, [Internet]. Alzheimers.net [cited 02 July 2018]. Available from https://www.alzheimers.net/resources/alzheimers-statistics/
7. Nan Hu, Jin-Tai Yu, Lin Tan, Ying-Li Wang, Lei Sun, and Lan Tan, "Nutrition and the Risk of Alzheimer's Disease," BioMed Research International, vol. 2013, Article ID 524820, 12 pages, 2013. https://doi.org/10.1155/2013/524820.
8. Mazza M, Marano G, Traversi G, Bria P, Mazza S. Primary cerebral blood flow deficiency and Alzheimer's disease: shadows and lights. J Alzheimers Dis. 2011;23(3):375-89. doi: 10.3233/JAD-2010-090700. Review. PMID: 21098977
9. Hooper, C., De Souto Barreto, P., Coley, N., Cesari, M., Payoux, P., Salabert, A. S., … for the MAPT/DSA Study Group. (2017). Cross-sectional Associations of Fatigue with Cerebral β-Amyloid in Older Adults at Risk of Dementia. *Frontiers in Medicine*, *4*, 173. http://doi.org/10.3389/fmed.2017.00173
10. Howard Crystal, MD. Alzheimer's Disease Picture Image [Internet]. MedicineNet.com [cited 21 July 2018]. Available from https://www.medicinenet.com/image-collection/alzheimers_disease_picture/picture.htm
11. Xerostomia (Dry Mouth) and Alzheimer's [Internet]. alznorcalblog.org 2016 [cited 21 July 2018]. Available from www.alznorcalblog.org/2016/12/15/xerostomia-dry-mouth-alzheimers/
12. 12. Alzheimer's Disease: Common Medical Problems. [Internet]. nia.nih.gov [cited 21 July 2018]. Available fromhttps://www.nia.nih.gov/health/alzheimers-disease-common-medical-problems
13. Kai, K., Hashimoto, M., Amano, K., Tanaka, H., Fukuhara, R., & Ikeda, M. (2015). Relationship between Eating Disturbance and Dementia Severity in Patients with Alzheimer's Disease. *PLoS ONE*, *10*(8), e0133666. http://doi.org/10.1371/journal.pone.0133666
14. Husebo, B. S., Achterberg, W., & Flo, E. (2016). Identifying and Managing Pain in People with Alzheimer's Disease and Other Types of Dementia: A Systematic Review. *CNS Drugs*, *30*, 481–497. http://doi.org/10.1007/s40263-016-0342-7
15. Thawani, S. P., Schupf, N., & Louis, E. D. (2009). Essential tremor is associated with dementia: Prospective population-based study in New York. *Neurology*, *73*(8), 621–625. http://doi.org/10.1212/WNL.0b013e3181b389f1
16. Seçil, Yaprak & Arıcı, Şehnaz & İncesu, Tülay & Gürgör, Nevin & Beckmann, Yeşim & Ertekin, Cumhur. (2016). Dysphagia in Alzheimer's disease. Neurophysiologie Clinique/Clinical Neurophysiology. 46. 10.1016/j.neucli.2015.12.007.
17. Armstrong, R. A. (2009). Alzheimer's Disease and the Eye. *Journal of Optometry*, *2*(3), 103–111. http://doi.org/10.3921/joptom.2009.103
18. Dodd, J.W. Lung disease as a determinant of cognitive decline and dementia. *Alz Res Therapy***7,** 32 (2015). https://doi.org/10.1186/s13195-015-0116-3
19. Pauline Anderson. Adult Asthma Linked to Higher Dementia Risk. [Internet]. webmd.com [cited 21 July 2018]. Available from https://www.webmd.com/asthma/news/20141031/adult-asthma-dementia
20. Ana Sandoiu. Sleep disorders may predict Alzheimer's disease [Internet]. medicalnewstoday.com 2017 [cited 21 July 2018]. Available from https://www.medicalnewstoday.com/articles/318273.php.
21. Lauriola M, Mangiacotti A, D'Onofrio G, et al. Neurocognitive Disorders and Dehydration in Older Patients: Clinical Experience Supports the Hydromolecular Hypothesis of Dementia. *Nutrients*. 2018;10(5):562. Published 2018 May 3. doi:10.3390/nu10050562

22. De Giorgio, R., Ruggeri, E., Stanghellini, V., Eusebi, L. H., Bazzoli, F., &Chiarioni, G. (2015). Chronic constipation in the elderly: a primer for the gastroenterologist. *BMC Gastroenterology*, *15*, 130. http://doi.org/10.1186/s12876-015-0366-3
23. Neuroinflammation Working Group, Akiyama, H., Barger, S., Barnum, S., Bradt, B., Bauer, J., *etal* Wyss–Coray, T. (2000). Inflammation and Alzheimer's disease. *Neurobiology of Aging*, *21*(3), 383–421.
24. Alzheimer's disease - Symptoms and causes - Mayo Clinic [Internet]. mayoclinic.org 2017 [cited 21 July 2018]. Available from https://www.mayoclinic.org/diseasesconditions/alzheimers-disease/.../syc- 20350447
25. Eugene Rubin. The Relationship Between Schizophrenia and Dementia. [Internet]. psychologytoday.com [cited 21 July 2018]. Available from https://www.psychologytoday.com/.../the-relationship-between-schizophrenia-and-dementia%3Famp
26. Renée FAG de Bruijn and M Arfan Ikram. Cardiovascular risk factors and future risk of Alzheimer's disease. BMC Medicine 2014; 12:130 https://doi.org/10.1186/s12916-014-0130-5
27. Kato-Narita EM, Radanovic M. Characteristics of falls in mild and moderate Alzheimer's disease. Dement Neuropsychol 2009 December;3(4):337-343
28. Lauren Tousignant. Your nightmares might be a dementia warning sign - New York Post. [Internet]. nypost.com 2017 [cited 21 July 2018]. Available from https://nypost.com/2017/06/01/your-nightmares-might-be-a-dementia-warning-sign
29. Streitbürger D-P, Möller HE, Tittgemeyer M, Hund-Georgiadis M, Schroeter ML, Mueller K (2012) Investigating Structural Brain Changes of Dehydration Using Voxel-Based Morphometry. PLoS ONE 7(8): e44195. https://doi.org/10.1371/journal.pone.0044195
30. Dr. K. Durairasan H.P.I.M. Siddha Hygiene and Preventive Medicine (in Tamil); 1st ed., Indian Medical College, Chennai, 1986; pp.187- 220
31. Dr. Kaa. Su. Uthamarayon B.H.I.M. *Siddha Aruvai Maruthuvam;* 2009, 5th ed., Dep. Of Indian Medicine and Homeopathy, Chennai.
32. Dr. Kaa. Saa. Murugesha Mudhaliar. Siddha Materia Medica (Medicinal Plants Division) Part I.2nd ed (2nd reed; Department of Indian Medicine and Homeopathy, Chennai, 2006
33. Sambasivam Pillai T V, Dictionary Based on Indian Medical Science, Published by Directorate of Indian Medicine and Homeopathy, Chennai, India, Vol. IV, First Edition: 1978.
34. Kannan Rajaram T. *Varma Maruthuva adippadaigal*. ATSVS Siddha Medical College, Munchirai, 2008
35. Kaa.soo. Uthamarayan. *Siddha Maruthuvanga surukam.* 1st ed., Government of Tamil Nadu, Chennai, 1983,
36. R Shailaja, S Sugunthan Concept of Nano technology in Siddha Medical Literatures. World journal of Pharmaceutical Research, 5(10); 2016: 276 -284 DOI: 10.20959/wjpr201610-7102
37. ClÃ¡udia Saraiva, Catarina PraÃa, Raquel Ferreira, Tiago Santos, Lino Ferreira, Liliana Bernardino, Nanoparticle-mediated brain drug delivery: Overcoming bloodâ€"brain barrier to treat neurodegenerative diseases, Journal of Controlled Release, Volume 235, 2016, Pages 34-47, ISSN 0168-3659, https://doi.org/10.1016/j.jconrel.2016.05.044.
38. Jiyoung Kim, Hyong Joo Lee, Ki Won Lee Naturally occurring phytochemicals for the prevention of Alzheimer's disease *J. Neurochem.* (2010) 112, 1415–1430. https://doi.org/10.1111/j.1471-4159.2009.06562.x
39. Keith A. Wollen, PhD. Alzheimer's Disease: The Pros and Cons of Pharmaceutical, Nutritional, Botanical, and Stimulatory Therapies, with a Discussion of Treatment Strategies from the Perspective of Patients and Practitioners. Alternative Medicine Review. Volume 15, Number 3, 2010;225 -244 *www.altmedrev.com/archive/publications/15/3/223.*
40. Limpeanchob N, Jaipan S, Rattanakaruna S, Phrompittayarat W, Ingkaninan K. Neuroprotective effect of *Bacopamonnieri* on beta-amyloid-induced cell death in primary cortical culture. J Ethnopharmacol. 2008 Oct 30;120(1):112-7. doi:10.1016/j.jep.2008.07.039. Epub 2008 Aug 5. PubMed PMID: 18755259.
41. Tamara Simpson, Matthew Pase, and Con Stough, "*Bacopa monnieri* as an Antioxidant Therapy to Reduce Oxidative Stress in the Aging Brain," Evidence-Based Complementary and Alternative Medicine, vol. 2015, Article ID 615384, 9 pages, 2015. https://doi.org/10.1155/2015/615384.
42. Reena Kulkarni, Suhas Kumar Shetty, Rajarajeshwari N M, Prasanna Narasimha Rao and Nayan J. Rasayana Herbs of Ayurveda to Treat age Related Cognitive Decline: An Update. Pharmacogn J. 2016;8(5):411-423 http://www.phcogj.com/sites/default/files/10.5530pj.2016.5.1.pdf.
43. Hanapi Nur Aziah, Yusof Siti Rafidah, Adenan Mohd Ilham, Tengku Muhammad TengkuSifzizu. Blood-brain barrier permeability studies of *Centellaasiatica* extract as potential neuroprotective agent. Frontiers in Cellular

Neuroscience. 00142http://www.frontiersin.org/Journal/FullText.aspx?s=156&name=cellular_neuroscience&ART_DOI=10.3389/conf.fncel.2016.36.00142DOI=10.3389/conf.fncel.2016.36.00142 ISSN=1662-5102

Source of Support: Nil
Conflict of Interest: None Declared

How to cite this URL: Jenefa Rose Priya. T: Alzheimer's Disease - Understanding Siddha Medicine Looms in Special Reference with Mata Alivu. International Ayurvedic Medical Journal {online} 2020 {cited September, 2020} Available from: http://www.iamj.in/posts/images/upload/2486_2493.pdf