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Scientific Clinically Significant Concepts of *Vayu (Vata)*

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Vayu (Vata)

Vata, Pitta, Kapha are the concepts of molecular biology of the body. If *Vayu* is equated to only neurotransmission and hormonal functions in description of Charaka cannot be accomplished. As Charaka quotes *Vastantrayantradharah.* It falls very restricted description and cannot explain all the functions or actions envisaged for *Vayu*.

Neurohormonal basis only explains the *Yantra* (mechanistic) part of the whole *Tantra Yantradhara* Tantradhara relates to whole organization of the body, where seventy trillion cells perform under one unified command. Therefore, *Vata* concept probably also related with genome.

Double helix structure of DNA (Deoxy-Ribonucleic Acid) as the basic structure of genome has laid the foundation for the understanding of the basic molecular biology. Nucleic acids are also proteins. All the proteins have nitrogen. In chemistry of *Panchamahabhuta*, *Vay*u is the combination mainly of nitrogen, oxygen and other minor gases. Various biomolecules, that include gene proteins and small gas molecules e.g. NO, CO act on surface receptor of the cells to form specific receptor complex resulting into specified action depending on the type of the cells .Gene proteins or regulatory proteins act through endocrine, paracrine and autocrine mechanisms. Therefore regulating proteins also participate in the umbrella functions of *Vayu* that can satisfy the description of *Tantrayantradhara,* action of *Vayu.* Another interesting description of *Vayu* is *Rajobahulo Vayu* in Ayurveda. *Rajas* are signified by motivated action with resultant impetus the change in the type of particle motion can be compared to rajas. When the ultra-sound is introduced in to this solution the particles are observed to be organizing themselves into cell layers. This organizational ability is derived from the *satva guna* of Akash. Because of this, Vata is responsible for both structure and function of the body, as *Tantrayantradhara* description of Charaka.

Structural and functional enzyme proteins are regulated by gene proteins. Self-assembly is the property of all the biomolecules. One of the most important regulatory gene is P53. It is also known as molecular guard. It regulates the repair and the programmed death (apoptosis) of the cell.

Now looking at the description of (*Yantradhara Vayu) functions* of *Vayu*, one comes to know how the gases generated in the body and perform all the bodily functions. Many scholars tried to correlate the functions of *Vayu* with that of neurotransmitters like Acetylcholine and Adrenaline etc. But they are not gaseous in nature. So all the description of *Vayu* fits into the function of Psycho-neuro-hormonal system. A gas as a neurotransmitter can only answer the definition of *Vayu.* Latest neurotransmitter which is Nitric Oxide (NO). It is a gas produced by the endothelial cells of the vascular system and many other tissues of the body. *Vayu* can be told as the biological air, which is the combination of Nitrogen and Oxygen active by resonance factor of *Akasha.*

Different types of gases which are part of atmospheric air are O_2, CO_2, CO and nitrogen etc. Are utilized in the body for all the biological functions. L-arginine, a semi essential amino acid is substrate for the NO generation. It is synthesized by the action of different Nitric oxide synthases in different tissues of the body. In the nervous system nNOS, aNO synthases is responsible for the generation of NO. It is called gene product-1. It generates NO in neurons and glial tissues. It regulates the cerebrovascular tone and regulates the learning and memory (*Prana and Udana*) functions. The second Nitric oxide synthases is inducible iNOS which is called gene-product-2. It generates NO in Monocytes, macrophages, smooth muscle cells, cardiomyocytes, hepatocytes and mega-karocytes etc. It plays great role in maintaining the general immunity and inflammatory reaction of the body (*Samana* and *Vyana* functions). eNOS is the third gene product-3, which is responsible for generation of NO in the vascular endothelial cells. It determines the cerebral blood flow. NO reacts which guanyl cyclase resulting in forming of cGMP, which is the relaxant of all the smooth muscles including the sphincters in GI tract (*Samana Vayu function*). It causes vasodilatation. This action of NO is responsible for penile erection, which is the basis for the action of -*Apana Vayu* function.

Another *Vayu* is Carbon mono- oxide (CO). It is also an important neurotransmitter. Both NO and CO are different from other neurotransmitter, since both have two way actions on both afferent and efferent nerves as well on pre and post synaptic neurons. Both of them are important for the purpose of memory consolidation.

Prostaglandins are local hormones produced in almost all the tissues and body fluids in response to diverse stimuli mechanical, thermal, chemical, bacterial and hormonal etc. They are chiefly responsible for the pain sensation and inflammation. Vitiated *Vata* is the cause of pain according to Ayurvedic conceptualization. These are the concepts, suggest *VAYU* as Psycho-neuro-hormonal system.

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Role of Pakshaghata Chikitsasutra in the Management of Ischemic Heart Disease (IHD) w.s.r to Herbal Antithrombotic Drugs

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Abstract Myocardial infarction results when a blood clot interrupts or blocks blood flow to the heart, which starves the heart muscle of oxygen and causes heart muscle cells to die; the same process in the brain causes a stroke. Hemiplegia is included under Pakshaghata described in the chapter of *Vatavyadhi chikitsa.* Antithrombotic is any medication that decreases clots in the body. The concept of Antithrombotic is not as such mentioned in Ayurvedic classics. The paper critically analyses the concept of antithrombotic drugs in Ayurvedic classics and the role of *Pakshaghata chikitsasutra* in the management of ischemic heart disease. Some of the ayurvedic herbal drugs scientifically validated for antithrombotic activity are also presented.
Keywords *Pakshaghata chikitsasutra; Ischemic Heart Diseases; Antithrombotic drugs*

1. Introduction

Charakasamhita enumerates *Hridroga* under *Trimarmiya chikitsa* [1], while the management of *Pakshghata* is described in the chapter of *Vatavyadhichikitsa* [2]. Reason for non-inclusion of *Pakshaghata* (hemiplegia) under shiromarmagatavyadhis is not known. Hemiplegia is usually included under pakshaghata and the main causative factor i.e., hypertension was not directly referred in ayurvedic classics. Cerebral ischemia may result due to thrombin or hemorrhage in cerebral vascular structures. During the progress of this condition initially patient may suffer from transient ischemic attacks and it may lead to stroke or death. Same chain of events takes place even in coronary artery leading to either angina or myocardial infarction. Ischemic heart disease is the generic designation for a spectrum of disorders resulting from imbalance between the myocardial need for oxygen and the adequacy of blood supply [3]. Coronary vasospasm alone or superimposed atherosclerotic narrowing may contribute to the reduction in the flow. Blood vessels injured by smoking, cholesterol, or high blood pressure develop cholesterol-rich build-ups (plaques) that line the blood vessel; these plaques can rupture and cause the platelets to form a clot. A heart attack (myocardial infarction) results when a blood clot interrupts or blocks blood flow to the heart, which starves the heart muscle of oxygen and causes heart muscle cells to die; the same process in the brain causes a stroke. Antithrombotic is any medication that decreases clots in the body (by dissolving already formed clots or preventing clot formation [4]. This includes the drug classes like

anticoagulants, antiplatelets, and thrombolytics. Antithrombotics can be used therapeutically for prevention (primary and secondary prevention) or treatment of dangerous blood clots (acute thrombus).

Ayurvedic classics, compendia, research journals and internet publications were referred to compile the relevant information.

2. Observation and Discussion

2.1. Concept of Antithrombotic Drugs in Ayurveda

Anatomical and physiological aspects of antiplatelet/ anticoagulant/thrombolytic drugs are not as such mentioned in Ayurvedic classics. Due to defective metabolism (impaired function of agni) morbid accumulation of *kapha* and *medas* (*sanghata*) occurs in the *Rasaraktavaha srotas*. Due to this flow gets obstructed. "*Shonitasanghatabhedana*" is the term used to describe the drugs which remove the sanghata (obstruction) and facilitates free movement in the raktavahasrotas [5]. Katu rasa is ascribed with the property of "s*honitasanghatabhedana*". Katu rasa with its *ushna, tikshna* and *laghu* gunas acts as *agnideepana* (corrects the digestive and metabolic functions) *lekhana* (scrapes/ dries up the kapha and medas) and *chedana* (disunites/separates the adhered kaphadidoshas from the srotas). The drugs of *Katu rasa skanda* [6] including *Pippalyadi, Salasaradi* and *Surasadi gana* dravyas and that of *lekhaniya dashemani* [7] and *chedaniya* dravyas [8] can be judiciously used in dissolving the clots. Dalhana interprets *lekhana* as *medonashana* [9]. Acharya Sushruta in *Sonitavarnaniya adhyaya* describes a group of drugs which facilitates the free flow of blood [10]. The drugs included are Ela (*Elettaria cardamomum*), Karpoora (*Cinnamomum camphora*), Kushta (*Saussurea lappa*), Tagara (*Valeriana wallichii*), Patha (*Cissampelos pariera*), Bhadradaru (*Cedrus deodara*), Vidanga (*Embelia ribes*), Chitraka (*Plumbago zeylanica*), Trikatu (*Piper longum, Piper nigrum*, *Zingiber officinale*), Agaradhuma, Haridra (*Curcuma longa*), Arkankura (*Calotropis procera*) and Naktamalaphala (*Pongamia pinnata*). The drugs are prescribed for avagharshana with lavana and thaila externally. The internal use of these drugs may be useful in dissolving the obstruction (clot) and facilitating the free flow of blood. Kshara dravyas (alkalis derived from herbs) described also helps in removing the obstruction in the srotas. Charaka advises the use of ksharas of Utpalanala (*Nymphaea stellata*), Ambhoja (*Nelumbo nucifera*), Palasha (*Butea monosperma*), Asana (*Pterocarpus marsupium*), Priyangu (*Callicarpa macrophylla*), Madhuka (*Glycyrrhiza glabra*) with honey and ghee in dissolving the blood clots (*kaphanubhanda grathita rakta*) [11]. According to Chakrapani sonitasthapana drug remove the vitiation of rakta and help to bring back the normalcy of *rakta dhatu* [12]. Similarly drugs like sariva, manjishta which are raktaprasadana also purify the vitiated rakta. Even though anticoagulant/antiplatelet activity is not mentioned as such, acharyas of ayurveda explained various procedures and drugs which help to remove the obstruction in the raktavaha srotas and help in the normal functioning of *Raktadhatu*.

2.2. Pakshaghata Chikitsasutra and Thrombolytic Activity

स्वेदनं स्नेहसंयुक्तं पक्षाघाते विरेचनम्॥

The chikitsasutra for pakshaghata consists of *snehana, swedana* followed by *virechana* (purgation) [13]. Any obstruction in the *Rasaraktavahasrotas* (*srotosanga*) causes interruption to interchange of nutrient material and waste material between capillaries and cells. The nutritive material passes through the semi permeable capillary walls in to the tissue fluid by the net outward pressure that is the difference between the arterial blood pressure and osmotic pressure inside the capillary. Extraction of waste (water and waste products from cell) fluid from the tissue fluid in to the venous

blood vessels occurs due to net pressure. If any interruption occur in this process it causes accumulation of waste material (vitiated dosas or metabolites in the tissue).*Sweda karma* hastens this process by increasing the permeability of capillary and bringing the morbidities into extra cellular fluid by dilating and clearing the channels of the body. *Charaka envisages* the concept about pharmaco-kinetics of *vamana and virechana* drugs in kalpasthana [14]. *Virechana dravyas* that are *ushna, tikshna, sukshma vyavayi* and *vikashi* reaching the heart by virtue of their potency (*virya*) circulating through the large and small blood vessels pervade the whole body. One can easily conceive that *virechana dravya*s plays a pivotal role in removing the block in the *srotas* (thrombolytic activity) [15]. Rechana is also indicated in *urdhwagata raktapitta* [16] and cerebral hemorrhage may be categorized under it. This may be the reason for *virechana* being the prime treatment of *Pakshaghata* which is a *vataja nanatmajavikara.* Treatment modalities like *snehana, swedana* and *rechana* may exert thrombolytic effect and facilitates to improve collateral circulation and blood supply to the affected area. So the chikitsasutra suggested for the management of *pakshaghata* may hold good to treat ischemic heart diseases.

2.3. Some Scientifically Validated Herbal Antithrombotics

Haridra (*Curcuma longa* Linn)

Haridra is a common house hold condiment and a domestic remedy for cuts and wounds. Haridra possess *katu, tikta rasa* and *ushna virya* [17]. It is included in *lekhaniya dashemani* by Charaka. Vaghbhata mentions *Haridra* as the a*gryoushadha* for *prameha* along with *Dhatri* [18]. Curcuma longa is experimentally proven for its hypolipidaemic, antiatherosclerotic, antioxidant and antidiabetic activities [19]. Curcumins inhibit platelet aggregation and enhance fibrinolytic activity. Curcuma longa preparations have shown antithrombotic activity in experimental rats. In rabbits with experimental atherosclerosis turmeric extract as well as curcumins have shown antiatherosclerotic activity. An in vitro thrombolytic model was used to check the clot lysis effect of aqueous herbal extracts of C. longa, along with Streptokinase as a positive control and water as a negative control. The percentage (%) clot lysis was statistically significant ($p<0.0001$) when compared with vehicle control. C. longa showed moderate clot lysis activity 32.94 ± 3.663%) whereas standard streptokinase showed 86.2 ± 10.7 % clot lysis [20].

Bhunimba (*Andrographis paniculata* Nees)

Andrographis paniculata known as *Bhunimba* in traditional system of medicine is highly used for the treatment of jaundice and other liver disorders. Bhunimba possess tikta rasa, laghu ruksha guna and katuvipaka [21]. It is deepana and kaphapittahara. Several in vivo studies in rats and mice have proved the hypoglycemic, hepatoprotective, anti-inflammatory and antioxidant activities of Andrographis paniculata [22]. Considerable work has been carried out on the effect of extracts of this plant as well as that of its constituents on cardiovascular system. Andrographolides of the plant has shown antihypertensive activity in rats. The crude extract as well as andrographolide inhibited PAF-induced human platelet aggregation. Animal experiments have shown *A. paniculata* has antiatherosclerotic activity and it has been suggested that this plant preparation may help in preventing re-stenosis of arteries after coronary angioplasty. Crude ethanol extract and soluble fraction of ethanol extract have shown in vitro thrombolytic properties [23].

Madhuka (*Glycyrrhiza glabra* Linn)

Glycyrrhiza glabra has been recognized as a highly valuable medicinal herb from the times of Caraka and Susruta. Madhuka is included in Jivaniya, Sandhaniya, Varnya, Kandughna and

Angamardaprasamana dashemani by Caraka [24]. Glycyrrhiza glabra has received significant attention from modern scientific researchers, chiefly because it is an important herbal medicine in Europe, and is official in several pharmacopoeias. Flavonoids from the root have significant antioxidant activity [25]. Glycyrrhiza glabra has shown clot lysis activity in invitro thrombolytic model [26]. The chemical constituents Glycyrrhizin and Glycyrrhetic acid have shown corticoid like activity. Crude drug because of its mineralocorticoid activity of its main constituent glycyrrhizin, if ingested orally in large doses (>50g crude drug per day) over an extended period of time leads to hypokalaemia, hypernatreamia, oedema, hypertension and cardiac disorders. These problems disappear in the course of a few days after stopping the drug. Preparations of liquorice should not be taken for longer than 6 weeks [27].

Sariva (*Hemidesmus indicus* R. Br.)

Sariva commonly known as Indian sarsaparilla is a perennial climbing plant and native of India. The plant is well known for its anti-oxidant and anti-inflammatory activity [28]. Methanolic extract of roots on intravenous administration in rabbits (5mg/kg) delayed plasma recalcification time and enhanced the release of lipoprotein lipase enzyme, thus indicating significant antithrombotic activity. The extract also inhibited ADP induced platelets aggregation (in vitro) and the effect was comparable to that of heparin [29].

Ananta (*Fagonia arabica* Linn.)

Fagonia arabica is an ethno-pharmacologically important Ayurvedic herb known to have many medicinal properties like anti-inflammatory, analgesic, antipyretic and antioxidant effects [30]. An in vitro thrombolytic model was used to check the clot lysis effect of *Fagonia Arabica.* Fagonia arabica showed significant clot lysis (75.6%) with reference to Streptokinase (86.2%) [31].

Tulasi (*Ocimum sanctum* Linn)

Tulasi is highly valued in ayurveda for normal health maintenance and possess katu tikta rasa and is considered hridya [32]. It is deepana, mitigates the deranged kapha vata and useful in diseases of blood. *O.sanctum* leaves have been demonstrated to exhibit hypoglycaemic, hypolipidaemic and antioxidant activities [33]. Alcohol extract of the leaves of *O. sanctum* (different doses upto 400mg/kg,p.o) showed cardioprotective effect against isoproterenol (200mg/kg subcutaneously) induced myocardial infarction in rats. Aqueous herbal extracts of *O. sanctum* has shown in vitro thrombolytic activity, along with Streptokinase as a positive control and water as a negative control. The percentage (%) clot lysis was statistically significant ($p<0.0001$) when compared with vehicle control. O. sanctum showed moderate clot lysis activity 32.94 ± 3.663%) whereas standard streptokinase showed 86.2 ± 10.7 % clot lysis [34].

Pippali (*Piper longum* Linn)

Pippali is one of the ingredients of trikatu and is employed in very large large number of Ayurvedic formulations meant for therapeutic end uses. Pippali is deepana vrishya laghu and anushna. It mitigates the deranged Kapha vata. Bhavamisra mentions that Pippali when used with honey acts as kapha medohara [35]. Piper longum has been experimentally proven for hypoglycemic and coronary vasodilatory activities [36].

The anticoagulant activities of Piperlongumine (PL) were examined by monitoring activated partial-thromboplastin-time (aPTT), prothrombin-time (PT), and the activities of thrombin and activated factor

X (FXa). The effects of PL on the expressions of plasminogen activator inhibitor type 1 (PAI-1) and tissue-type plasminogen activator (t-PA) were also tested in tumor necrosis factor-α (TNF-α) activated HUVECs. The results showed that PL prolonged aPTT and PT significantly and inhibited the activities of thrombin and FXa. PL inhibited the generation of thrombin and FXa in HUVECs. In accordance with these anticoagulant activities, PL prolonged in vivo bleeding time and inhibited TNF-α induced PAI-1 production. Furthermore, PAI-1/t-PA ratio was significantly decreased by Piperlongumine [37].

Sunthi (*Zingiber officinale* Roscoe)

Ginger is valued as a spice and has been used through ages in almost all systems of medicine against many maladies. Sunthi is *kaphavatahara*, *pachana* and *vibandhabhedana* [38] (breaks down the obstruction). Different extracts of ginger is reported to have, antibacterial, antioxidant, antiulcer, anti-inflammatory, cardioprotective and hypocholesterolaemic activities [39].

In a study some of the isolates from *Z.officinale* were subjected into the evaluation of their antiplatelet aggregation and vasorelaxing bioactivities. Among the tested compounds, [6]-gingerol and [6]-shogaol exhibited potent anti-platelet aggregation bioactivity. In addition, [10]-gingerol inhibited the Ca^{2+}-dependent contractions in high K^{+} medium [40].

Lashuna (*Allium sativum* Linn)

Garlic (*Allium sativum*) is among the oldest of all cultivated plants**.** Most recent data published convincingly point out that garlic and its various forms reduce cardiovascular risk, including abnormal plasma lipids, oxidized low density lipoproteins (LDL), abnormal platelet aggregation and a high blood pressure [41]. Stimulation of nitric oxide generation in endothelial cells seems to be the critical preventive mechanism. Garlic may promote an anti-inflammatory environment by cytokine modulation in human blood. Cardioprotective effects of dietary garlic are mediated in large part via the generation of hydrogen sulfide (H2S). Garlic-derived organic polysulfides are converted by erythrocytes into hydrogen sulfide which relaxes vascular smooth muscle, induces vasodilation of blood vessels, and significantly reduces blood pressure. There are data on potential ability of garlic to inhibit the rate of progression of coronary calcification [42].

Dronapushpi (*Leucas aspera* Willd)

Leucas aspera (Willd.) Linn. known as Dronapushpi is distributed throughout India from the Himalayas down to Ceylon. Dronapushpi is hot in potency (ushna) and mitigates kapha and ama. It is tikshna and bhedana [43]. *Leucas aspera* has shown antioxidant, hypoglycemic, diuretic and antimicrobial activities in different experimental models. An invitro thrombolytic model was used to check the clot lysis effect of organic extract of Leucas Aspera using streptokinase as a positive control and water as a negative control. Venous blood drawn from twenty healthy volunteers was allowed to form clots which were weighed and treated with the test plant materials to disrupt the clots. Leucas aspera showed very significant ($p < 0.0001$) percentage of clot lysis compared to reference drug streptokinase (75.00 ± 3.04%) [44].

Ikshvaku (*Lagenaria siceraria* (Molina) Standl.)

Ikshavaku has been recognized as a drug for therapeutic emesis from the period of Caraka and is particularly indicated in Prameha [45]. Ikshvaku possess tikta rasa, laghu ruksha guna and katuvipaka. It is kaphapittahara and hridya [46]. Antiatherosclerotic potential of L.Siceraria has been proveed experimentally. The flavonol and kaempferol present in L. siceraria were shown to exhibit

fibrinolytic activity comparable to streptokinase activity [47]. An ethanolic extract of L. siceraria fruit had a membrane-stabilising role in isoproterenol-induced myocardial infarction in rats [48].

Haritaki (*Terminalia chebula* Retz)

Haritaki (*Terminalia chebula* Retz) is held in high esteem in Ayurveda for its properties to prevent and cure diseases. According to Acharya Susruta Haritaki is the best drug to be used in santarpanotha vikaras [49]. Haritaki is hridya, medhya and kaphavatahara. Haritaki is laghu, ruksha ushna and possesses deepana, pachana, vibandhahara properties [50]. The crude methanolic extracts of Terminalia chebula exhibited potent platelet aggregation inhibition activity (in vitro) in a dose-dependent manner at concentration range (1 to 10 mg/ml) [51].

Brahmi (*Bacopa monnieri* (Linn) Pennell)

Bacopa monnieri, a plant commonly used in Ayurvedic medicine, has an age-old reputation for being an effective and powerful herb helpful for memory and combating stress. Brahmi is rasayana, Hridya, swarya and medhya [52]. Bacopa monnieri has been proven for its Antioxidant, Hypotensive, Vasodilator and Antidiabetic activities [53]. Chloroform extract of Bacopa monniera showed significant clot lytic properties in human blood samples. The mean percent clot lytic activity of chloroform plant extract of Bacopa monniera was found to be 48.39% [54].

3. Conclusion

Atherothrombotic diseases such as myocardial or cerebral infarction are serious consequences of the thrombus formed in blood vessels. Antithrombotics can be used therapeutically for prevention and treatment of blood clots. Treatment modalities of Pakshaghata like snehana, swedana and rechana may exert thrombolytic effect and facilitates to improve collateral circulation and blood supply to the affected area. The drugs described by virtue of their katu rasa (pungent taste), ushna virya (hot potency), tikshna guna (sharp nature), deepana, vibandhahara (removes obstructions) and lekhana (scrapes/ dries up the kapha and medas) karmas remove the obstruction in the strotas and may act like antithrombotic drugs. So the chikitsasutra suggested for the management of pakshaghata and the judicial use of the above mentioned ayurvedic herbs may hold good to treat ischemic heart diseases.

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Research Article | Open Access

Acupuncture Treatment for Migraine

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Abstract In the research are included 30 patients, 12 male and 18 female, on age from 29 to 79, who were treated with acupuncture treatment in our clinic in a period of one year. All patients had acupuncture treatment in a clinic for TCM and acupuncture in Skopje, Macedonia, by a doctor specialist in acupuncture. Acupuncture points that were treated are: Baihui-DU20, Sishencong-EX-HN1, Yangbai-GB14, Yintang-EX-HN3, Taiyang-EX-HN5, Hegu-LI4, Zhongwan-RN12, Zusanli-ST36, Sanyinjiao-SP6, Taichong-LR3, Fengchi-GB20, Dazhui-DU14, Pishu-BL20, Weishu-BL21, Ganshu-BL18. After the acupuncture treatment the effect was achieved in all patients with certain number of treatments and all the symptoms that they complained about before were gone afterwards. There were more female than male patients, with average age of 49. In most of the patients effect was achieved with 5 to 10 treatments. Acupuncture treatment as part of the 5000 year old Traditional Chinese Medicine (TCM) can successfully relieve the migraine symptoms, decrease the pain, reduce inflammation and improve the blood and Qi circulation through the body and meridians Acupuncture as a treatment for migraine gives positive results and can successfully improve the health and well-being of the patients.
Keywords *acupuncture; traditional Chinese medicine; treatment; migraine*

1. Introduction

Migraines are one of the most common types of headaches that occurs periodically. Studies show that from this type of headache are suffering 20% of the population. Migraine occurs in women two to three times more often than in men [1]. There are two type of migraine: classical (with aura) and common migraines (without aura). The pain often begins on the one side of the head and spreads to both or stays on one side. The pain can be described as pounding, pulsating or throbbing and it can be very intense often concentrated around the temples up front to the forehead. The pain can last 4-72 hours. The symptoms that may occur are: dizziness, vomiting, nausea, fatigue, visual disturbance, neck pain and etc. The reason of appearance is not exactly sure but it involves changes in the brain blood flow. There also might be genetic link to the migraine (half of people suffering from migraines have affected family member). Possible causes (triggers) for migraine can be: alcohol, crying, stress, caffeine, medications, certain odors, hormones (during pregnancy), certain foods and etc. Risk factors are: gender (women are more likely to have migraine than men), birth control pills, family

members with migraines, age (under 40), sensitivity and exposure to some of the triggers and etc. [2]. Acupuncture treatment as part of the 5000 years old TCM is successfully used in treating migraines to alleviate the pain, clear the symptoms, regulate the blood and Qi circulation, harmonize the internal state of the body, remove blockages and restore the balance of the body's energy [3].

2. Materials and Methods

In this research are included 30 patients, 12 male and 18 female, on age from 29 to 79. All the patients were diagnosed and had symptoms of migraine. All the patients have done acupuncture treatments on the same points and duration, in a clinic for Traditional Chinese Medicine and acupuncture in Skopje, Macedonia, by a doctor specialist in acupuncture. Treatments were made in a closed room, on a temperature of 25^0, with duration of the treatments of 35-40 minutes. In the treatment were used fine, sterile acupuncture needles size 0.25x25mm produced by Wuijuiang City Medical & Health Material Co., LTD. Acupuncture points that were treated are: Baihui-DU20, Sishencong-EX-HN1, Yangbai-GB14, Yintang-EX-HN3, Taiyang-EX-HN5, Hegu-LI4, Zhongwan-RN12, Zusanli-ST36, Sanyinjiao-SP6, Taichong-LR3, Fengchi-GB20, Dazhui-DU14, Pishu-BL20, Weishu-BL21, Ganshu-BL18.

3. Results and Discussion

From the analysis we can conclude that there were more women than men affected by migraine – 18 female and 12 male patients. The patients were on age from 29 to 79, with average age of 49 and the most common age groups of 30-40 and 50-60. On Table 1 the results are showing the age groups – 1 patient in the group of patients younger than 30 years, 8 patients in group of 30-40 years, 6 patients in the group of 40-50 years, 8 in the 50-60 group and only one patient in group of patients older than 70 years.

Table 1: *Age groups and number of patients in each group*

Age of the patients	Number of patients
< 30	1
30-40	8
40-50	6
50-60	8
60-70	6
>70	1

All the patients have made acupuncture treatments on the same points and effect was achieved in all patients with certain number of treatments. Most of the patients needed 5 to 10 treatments. The results from the analysis made for the number of treatment are shown on Table 2. 9 patients have made less than 5 treatments, 11 patients made 5-10 treatments, 7 made 10-15 and 3 patients made more than 15 treatments.

Table 2: *Number of acupuncture treatments done*

Number of treatment done	Number of patients
< 5	9
5-10	11
10-15	7
> 15	3

Before starting the treatments patients complained about various symptoms, but all of them had pain and headaches. Other symptoms are: vomiting, nausea, dizziness, blurred vision, sweating, hot sensations, high blood pressure, spondylosis, pulsating and throbbing pain, pressure of the head, worsening of the symptoms during cold weather and during changes in weather conditions. Patients who experienced symptoms of nausea and vomiting stated that after vomiting the pain was decreased and they felt better. All of the patients explained the pain (mostly had pain on the right side) like very strong headache starting from the nape and going up through the temples and front to the forehead. After the acupuncture treatment all the symptoms that they complained about before were gone.

Not all the headaches are the same. According to Western medicine there are five types of headaches: migraine, sinus, cluster, rebound and tension headache. TCM works in a way to treat the root of the headache (what is causing the pain) and the branch (the pain itself), therefore the pain is not just temporarily relieved but the results are long-term [4]. According to TCM migraine symptoms are connected to more than 9 different imbalances, a deficiency of blood or Qi, liver, bladder, stomach or gallbladder meridians disharmony, increased Yang energy in the head or combination. If the pain is frontal it is attributed to stomach meridians, if it's affecting the temples it is connected to the gallbladder and liver meridians and if it's going back to the nape it is connected to bladder meridians. Because migraine symptoms are connected and are coming from the imbalance of to the liver and gallbladder systems, then the triggers would be the things that these systems are highly sensitive of, like stress, alcohol, coffee, hormonal changes, emotions like frustration and anger. All the acupuncture points that were chosen to be treated are connected with the meridians of these organs (gallbladder, bladder, liver and stomach) and are used in the treatment to correct the underlying imbalance and alleviate migraine symptoms. With the acupuncture treatment the body is allowed to heal and self-regulate, to restore the free flow of the Qi energy and regulate the nervous and hormonal system [5]. Other studies done for acupuncture treatment for migraines also confirm positive results and reduction of the frequency of the headaches [6; 7; 8]. As a conclusion we can say that acupuncture, as part of the TCM, is a very helpful treatment for migraine, gives positive results and successfully is improving the health and well-being of the patients.

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Review Article **Open Access**

The Siddha Drug *Aya birungaraja karpam* (ABK) as Rejuvenative Elixir – A Scientific Review

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Abstract *Kayakarpam* is one of the specific therapeutic formulations in siddha medicine advocated for rejuvenation, which is formulated several thousand years back by our great Siddhars for the wellbeing of the human life by power of health securing the body. Thus it promotes health by preventing grey hair (*Narai*), wrinkling of the skin (*Thirai*) and senility (*Moopu*). This therapy ensures the longevity and elimination of disease causing factor. The aim of this review is to focus the *Aya birungaraja karpam* as rejuvenator. The datas were collected from Traditional siddha texts and from current research findings. Iron used as medicine from Vedic period, the ancient scientist siddha saint Bohar is the father of iatrogenic chemistry and the metallic medicine. The medicinal plants have phytoconstituents like phenolic compound and flavonoids which exert multiple pharmacological activities such as antioxidant and free radical scavenging activity. Thus the traditional medical system chosen as the alternative medical source, the drug from medicinal plant satisfies this need as they have innumerable benefits for the last three decades. The globe turns their eye towards the herbal medicine and its incredible pharmacological activities, pharmacoeconomic viability and less side effect. Reactive oxygen species play an important role in degenerative and pathological process, such as ageing, premature graying, lack of muscular and skin tone, Alzheimer's disease, neurodegenerative disorders, Atherosclerosis, Cardio vascular disease, Diabetes, Inflammatory diseases and cancer. Even though some of synthetic drugs have shown antioxidant and radical scavenging mechanism, the WHO turns their efforts towards the evolution and effectiveness of the medicinal plants and natural products for the condition where there is lack of safe synthetic drugs. Thus, tremendous efforts have been directed toward the discovery and development of natural antioxidant from medicinal plants and its products as protective system. It is concluded that free radical ions and reactive oxygen species causes pathological and degenerative conditions in Human whereas the ingredients of Aya birungaraja karpam (ABK) show antioxidant property and radical scavenging ability in a various physiochemical and pharmacological experiments. Thus ABK envisages longevity and elimination of disease causing factor.

Keywords *Kayakarpam; Antioxidant; Rejuvenation*

1. Introduction

Aya birungaraja karpam is one of the kayakarpa medicine (Rejuvenation Elixir) in siddha medicine. Kaya karpam means to keep the body like firm as stone; the word *'kaya*' means body and *'Karpam'* refer as able or competent, the siddhas have developed the kayakarpam for longevity, to be free from ailments and to make the body to be competent. Kayakarpam is the process of Rejuvenation which is transformable approach to health promotion, consciousness and also possess prophylactic action to safe life via improve health; thus endows human with long life, robust body, glorious health, super human strength, sharpen memory, enhance intellectual power and improves the charring complexion. Therefore the kayakarpam was a gift of the Siddhars' for the human beings for longevity and freedom from ailments.

This drug is used by Traditional practitioner in Sri Lanka and commonly used in government sector and Private practitioner in India. The ABK is included in the essential drug list of siddha medicine by AYUSH Drug Control Cell since 2013. The researchers reported that all kayakarpa plants have anti-radical and scavenging activity. The mechanism of antioxidant activity is describes as, prevention of free radical chain initiation, binding of transition metal iron catalysts, decomposition of peroxides. Prevention of continued hydrogen abstraction, reductive capacity and radical scavenging (Diplock et al., 1997). The reducing properties are generally associated with the presence of reductones, (Duh et al., 1998) thus exert antioxidant actions by breaking the free radical chain, by donating the hydrogen atom and also reductones reputed to react with certain precursors of peroxide, thus preventing peroxide formation (Gordon, 1990).

The modern lifestyle of individuals cause over production of free radicals and reactive oxygen species nowadays. The harmful elements are super oxide anions radicals, hydroxyl radicals and hydrogen peroxide. Our body has a nature defense mechanism to cope up with this oxidative stress, but the immunity power decreased the free radical override the defense mechanism, thereby damaging essential biomolecules such as protein, DNA and lipids which eventually causes premature graying and ageing, inflammatory diseases, Kidney diseases, diabetic mellitus, and several other degenerative diseases in humans (Halliwell, 1997). Now a days people took interest towards the herbal therapy and natural dietary antioxidants. The phenolic compounds rich in natural antioxidants plays role in health care as they provide protection from oxidative stress and associated diseases.

2. Objective

To explore the scientific validation of kayakarpam drug ABK.

3. Methods

The siddha aspects of literatures were collected from classical siddha text such as Siddha vaithiyathirattu, Paandukamalaichikitsai, Sarabenthira vathiyamuraikal, Siddha Materia Medica etc. The Research papers consulted from reputed website like Medline, Pubmed, Medlar etc.

4. Results and Discussion

The search of different siddha classical text reveals the various preparations of Parpam, Chendooram, Karpam etc., formulated with the ingredients of Iron and mandooram are the therapeutically effective drug. Most of the metal and mineral siddha formulations were prepared with adding medicinal plant juices and with the process of pudam (incineration) or Ravi pudam (sunlight). The review of current research findings also supported the ancient kayakarpa concept.

The standard formula of drug ABK contains powder of purified Ayam (Ferric iron) 140gm, Purified Mandooram (Ferrous iron) 210gm, *Wedelia chinensis* juice (Manjal karisalai) 1.3L and *Citrus limon* juice (Elumichai) 1.3L, This drug will not only act as nutritive natural iron supplement for curative care but also beneficial as rejuvenate therapy for Health promotion.

The *Ayam* (Iron)-(Ferrum) found in mountain and in earth in association with certain materials like sulphur; also found in plants and animals. The organoleptic character of ayam-Taste- Astringent, mild sour and bitter, Potency- Hot, Post digestive effect- sweet, Gunam - Ruksham. It acts as tonic, haemopoietic, appetizer, with health promoting properties. The *Wedelia chinensis* and *Citrus limon* plays the major role in this drug combination as they have Laxative and anti-emetic properties because the intake of oral Iron preparation may cause constipation and vomiting.

Iron is extensively used in the various medicinal preparations of siddha, Ayurveda and Unani, system of medicine, mostly utilized as transition metal in human health. Iron plays major role in the organic worlds and stands in very close relation to the fundamental process of the change of the matter and the metabolism because of its great affinity to the oxygen. Iron act as a catalyst for oxygen free radical which induces tissue damage. Hence it is used as the means of life as a protector, the existence of more active and potent iron restrain defense mechanism. The optimum iron level is highly recommended decrease morbidity and increase life span. The total body iron content in normal adult is the result of the balance between irons loses and absorbed from the diet. The normal intake of iron for Men and post-menopausal women is 10mg/day, premenopausal woman 15mg/day and pregnant woman 30mg/day. Increase intake or absorption resulted in Iron toxicity. Ayaparpam (Calx of iron) is the main constituents of iron containing formula, biologically produced nanoparticles proportionate to the type of pudam (incineration) applied on it, and thus elements can easily assimilate and eliminate their harmful effect and enhancing their bio-compatibility.

Mandooram-(Iron rust)–Hydrated Ferric oxide ($Fe_2O_3.H_2O$) known as Ayakiddam, Ayoomalam, Logamandooram, Kiddam in siddha medicine. It is prepared from iron rust consisting of iron particles of iron or forge scales scattered round the blacksmiths' anvil. It is more potent than iron. This substance is obtained by melting the iron in a furnace and collecting it in waxy consistency. Organoleptic character-Taste-bitter, potency-cold and post digestive effect-pungent. It is abundantly found in nature, during the purification process water portion of the hydrated ferric oxide was evaporated and remaining part get attached with ladle and only ferric oxide remains which are reddish brown in color. During heating of mandooram become brown and black in color and break into coarse particle, and metallic iron part may be exposed after potentiation process. This iron part becomes black Ferrosoferric oxide during heating to red hot. After the process of purification convert the raw mandooram into detoxicated form, then the rational pharmaceutical process convert it into medicinal form.

XRD Pattern of final product of iron oxide majorly present in the form of Fe_2O_3 and Fe_3O_4 (magnetite). During heating of iron oxide forming in its most stable form alpha-Fe_2O_3. In the Fe_3O_4 is the mixture of FeO & Fe_2O_3. The FeO is easily converted into its most suitable form Fe_2O_3. The EDAX analysis of mandooora parpam showed the percentage of the iron in the initial sample decreases after purification and pharmaceutical processing, and also found to be rich in K, Ca, S, Fe, Na, and P. All these elements increase the efficacy of drug which is taken from herbs after the purification process. The observation noticed the concentration of iron decrease in final product whereas high in raw material. The SEM monograph indicated the smooth surface area and reduced particle size. Mandoora parpam prevented the paraffin and CCl_4 mediated changes in the enzyme activities. These results suggest that mandoora parpam have protective activity in CCl_4 induced hepatic injury in albino

rats. Mandoora karpam instead of causing gastric irritation because of its ferrous salts, it act as gastro and hepato protective since it is significant protector against gastric ulcer induced by pyloric legation.

Wedelia chinensis (osbeck) Merrill, belongs to Asteraceae family commonly known as Manjal karisalai in siddha medicine; is a short perennial herb with, scabrous procumbent stem, and has a gorgeous growth. It contains Wedalolactone, dimethyl wedalolactone (Coumestans derivatives), large amount of phenolic constituents and also contains additive synergistic antioxidant property of phytochemicals such as flavonoids, triterpenoids, steroids etc.

The similar trends were reported that the phenolic and flavonoids constituents of medicinal plants possess antioxidant activity and free radical scavenging ability. Natural products of drugs containing free radical scavengers play a role in preventing and treating several disorders.

The in vitro and in vivo study in experimental mice, the essential oil of *Wedelia chinensis* showed moderate ability to scavenge hydroxyl radicals with standard antioxidant ascorbic acid and reducing power activity of essential oil of *Wedelia chinensis* was found to be high with standard Gallic acid.

Over production of free radicals results in oxidative stress, which leads to damage macromolecules, Gluthione, is a potent inhibitor of the neoplastic process, plays an important role in the endogenous antioxidant system The same study revealed that that the Gluthione level in the treated mice was significantly high in liver, lung and serum, whereas in the cancer induced control mice, it was found to be lower, this reveal that the antioxidant molecule present in the *Wedelia chinensis* have potent antioxidant activity.

Nitric oxide synthesis was high in tissues and plasma responsible for the development of many human cancers. In this study nitric oxide was found to be decreasing in the treated group which shows that the essential oil of *Wedelia chinensis* has the capability of cytotoxic *Wedelia chinensis*, the crude methanol extract exhibited the highest free radical scavenging activity which could be correlated to its phenolic contents. In the brine shrimp lethality bio assay, the hexane soluble fraction of *Wedelia chinensis* displayed the highest cytotoxic potential. The methanolic extract of *Wedelia chinensis* proved that the flavonoids rich fraction possessed fe^{2+}chealating agent activity and may play a protective role against oxidative damage induced by metal catalyzed decomposition reactions.

The comparative analysis of different solvent, the chloroform extract showed highest number of antioxidant band compared to other extract such as acetone and methanol because the molecules in chloroform extract had antagonistic effect whereas number of antioxidant molecule were less in acetone and methanol extract. Yet they showed more radical scavenging activity could be due its synergistic action of antioxidant molecules present in the two extracts.

The previous researchers were reported that the study of antioxidant mediated defense role of *Wedelia calendulaceae* herbal extract against ccl_4 induced toxic hepatitis, showed reducing lipid peroxidation and significant protective against the hepatic toxicant CCl_4 by antioxidant activity.

Citrus limon L- (lemon) -It is a small glabrous tree with stiff sharp spine, belongs to Rutaceae family, the organoleptic characters are, Taste- sour, potency- hot, post-digestive effect- pungent. Chemical compositions are Citric acid, phosphoric and malic acid, citrates of potassium. Actions- Nutritive, carminative, Refrigerant, Rubefacient, potassium salt ad phosphoric acid act upon the red corpuscles. The *Citrus limon* L, are rich source of various phytochemicals and nutrients, specially Vitamin C and phenolic acid are probably responsible for anti-radical and reducing power activity, both of them are contribute for higher power of antioxidant activity. The lemon contained highest amount of total

soluble protein, total DNA and pentose sugar content, showed good DPPH radical scavenging, thus it has the effect of scavenging free radicals, the involvement of free radicals especially their increased production is the reason for human diseases including cardiovascular diseases and cancer. Also it has been found that cysteine, glutathione, ascorbic acid, tocopherol, flavonoids, tannins and aromatic amines. For the measurement of reductive ability, the transformation from the Fe^{3+} to Fe^{2+} method showed marked antioxidant–reducing power activity in the lemon.

The presence of bioactive compounds such as hydrocinnamic acid, ferulic acid, glucoside, hesperidin and naringin content contribute to good health Antioxidant capacities can be influenced by the ripening time of citrus fruit; various researchers have studied the relationship between total phenol and different method antioxidant capacity assay. They clearly found excellent linear correlation between total phenolic profiles and antioxidant activity. The major antioxidant components in citrus fruits are tannins, antioxidant vitamins (ascorbic acid, tocopherol and beta-carotene), anthrocyamin, hydroxyl cinnamic acid with potential health promoting properties.

Antioxidant property of freshly prepared orange juice higher than commercially available juice. Ascorbic acid is highly bioavailable and is consequently the most important water soluble antioxidant vitamins in cells, effectively scavenging Reactive Oxygen Species (ROS) when relating the antioxidant activities of fruit juices to health and risk diseases, it is important to consider the contribution of ascorbic acid in addition to that of phenolic compounds with antioxidant activity The citrus fruits have high content of nutrients such as vitamin C, carotenoids and minerals as well as phenolic compounds hydrolysable tannins, flavinons contributing to the taste of astringency, bitterness, sourness and flavor. In particularly the phenolic compounds such as phenolic acids, flavonoids and hydrolysable tannins present in citrus fruits have gained much attention due to their strong antioxidant capacity and free radicals scavenging abilities which potentially have beneficial implications.

Kayakarpam has highly antioxidant activity which helps destroy and neutralize the strong reactive free radical ions and oxygen species to present in the human biological system. Free radicals may oxidize nuclear acids, protein and DNA, that influences degeneration process or disease, thus kayakarpam therapy prevent damage of cell membrane and DNA, thus, promote health. Free radical such as peroxide, Hydroperoxide and lipid and peroxyl scavenged by antioxidant like phenolic acid, polyphenol and flavonoids which inhibit the oxidative mechanism prevent damage of cells and enhance the healthy biological system. Basically detoxifies all the impurities, the main idea with the growth of newer younger, healthy cells. It is reversal of metabolic activities in the body. The rate of healthy new cells must form faster than the degeneration and death of old cells, in order to the arrest the symptoms of ageing process which is inevitable, irreversible decline in organ function that occurs overtime even in the absence of injury; illness or poor lifestyle choices (unhealthy diet and lack of exercises). Initially, the changes in organ function do not affect base line function; the first manifestations are reduced capacity of each organ to maintain homeostasis under stress. The cardiovascular system, Central nervous system and renal system are most common vulnerable area of affection occur. The immune system has connection with the number of other organs including brain, by activating primarily on the immune system on macrophages, the simple chemical of herbs through the activating cytokinine nature could produce all the action that have been attributed to them.

During ageing process the seven elements of body (sapthathathu) undergo changes as follows:

- *Sharam* – (Lymph) -Variation of viscosity of lymph and decrease or increase functions of lymph gland.

- *Seneer* – (Blood)– Variation of viscosity of blood, decrease Haemoglobin concentration, Blood vessels thickness, lumen size decreased and peripheral resistance increased.
- *Mamisam* (muscle)– Atrophy, dystrophy, wrinkling and shrinkage of the skin, efficient function of all muscle slowdown, therefore the heart, kidney, liver and other vital functions are retarded.
- *Kozhuppu* (Fat)–Over production or decrease production of fat due to defective lipid metabolism. Decrease fat pad beneath the skin, thus changes in the complexion in the body.
- *Moolai* (Brain)- Poor concentration, disturbance in memory, decrease immunity due to degeneration of brain cells.
- *Enbu* (bone) - Inefficient function of bone marrow leading to defective production of blood cells and thus blood formation will be affected.
- *Sukkila or Arthavam* (Sperm or Ovum) –Potency of sexual power diminish, efficient function of sperm and ovum will be ceased.

The physiology of rejuvenation is reversing the physical degeneration by transforming old cells to new again. Thus, Cell potential plays the major role to keep the cells healthy, this is voltage difference between the interior and exterior surface of the cells. The healthy cell potential should tween 70mV – 90mV. If potential fall below 70mV, the dynamics and kinetics of the body fluid and blood will be affected because enter the nutrients, Oxygen and water retarded as well as depletion of the carbon dioxide and water product also stagnated, thus too much of Na, Hydrogen remain inside the cell which make unhealthy cells.

5. Conclusion

It is concluded that since the *Aya birungaraja karpam* categorized under kayakarpa therapy discipline which is a unique system of Siddha medicine, act on the immune system, it has vital life enhancing effect, delay ageing process, improving mental function and freedom from ailments. The pharmacodynamics of the kayakarpam enlightened the components of medicinal plants such as ascorbic acid, carotene, gallic acid, phenolic compound such as Hydrolysable tannin and Flavonoids etc, seems to be target the ROR –Reactive Oxygen Species, thus modulating the endogenous system of the body and act on the different organs to produce its Myriad action.

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Research Article

Observational and Critical Assessment of Unani Pharmacopoeias and Formularies

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Abstract Pharmacopoeia is a book published by authority of a government or a medical or pharmaceutical society containing direction for the identification, enlisting, methods of preparation, safety, quality and efficacy, methods of collection and storage, methods of purification or detoxification, and dose of the drugs. Beside this entertaining of new drugs, addition or deletion in old drugs formulations and toxic effects of the drugs. Every country has pharmacopoeia like British pharmacopoeia, U.S. pharmacopoeia, Indian pharmacopoeia and National Pharmacopoeia of Unani Medicine, etc. According to W.H.O, One forty independent countries are at present employing some thirty national pharmacopoeias along with the African, European and International Pharmacopoeia. Various Unani Pharmacopeias have been written since ancient time in different era. These Pharmacopeias may not be referred as standard Pharmacopeias due to unsuitability with modern guidelines. In this paper it was tried to explore some well known Pharmacopoeias thoroughly with relevant observations and critical assessment.
Keywords: *Formulation; Pharmacopoeia; Purification; Qarabadeen; Unani medicine*

1. Introduction

The word ‘Qarabadeen’ (Pharmacopoeia) is derived from ancient Greek word φαρμακοποιΐα- (pharmakopiia) from φαρμακο-(pharmako) ″drug″, followed by the verb-stem ποι- (poi-) ″make″ and finally the abstract noun ending -ια - (-ia). These three basic words together can be rendered as “drug-mak-ing” or “to make a drug”. Literally the meaning of Qarabadeen is Tarkeeb-e-advia (Formulating a drug), in Arabic it means Tarkeeb-e-advia Mufrida and in modern sense it is known as pharmacopeia (Review of World Pharmacopoeias, 2012; Kumar, 2015).

Unani medicine is a traditional medicine, which like other traditional medicine e.g. Ayurvedic Medicine and Traditional Chinese Medicine, has a specific and unique set of principles and methods that are used in diagnosis and treatment of health conditions. Since diseases are caused by several factors such as dietetic irregularities, psychic factors and seasonal variations, several drugs are often combined together and used in the form of a recipe. Prior to administration, these drugs are processed in the form of juice, powder, decoction, infusion, pills, tablet, syrup, Majun and aqua, medicated oils and alcoholic preparations. While preparing and processing medicinal recipes, it is

always kept in the mind that, as far as possible, the medicine should be useful in the treatment of several ailments, therapeutically very potent, taste delicious, and have a long shelf-life. Thousands of such recipes and their particular experience are described in Unani text (Akbarabadi, 1998; Saad and Said, 2011). In the Unani systems of medicine drugs are enumerated in several pharmacopoeias currently being used among the professionals. Some of these, e.g. the Kabir Pharmacopoeia, the Azam Pharmacopoeia, the Qadri Pharmacopoeia, the Ilaj-ul-Amraj (Treatment of diseases) are detailed. Other like the Pharmacopoeia Ehsani, the Pharmacopoeia Zakai etc., is concise. All of them were compiled more than a century earlier, and are derived from the original Arabic Pharmacopoeia, although most of them enshrine certain observations based on original work. On the basis of their original observations these pharmacopoeias are definitely regarded as authentic (Akbarabadi, 1998).

2. Methodology

The review was taken up with scanning of the literature found in Unani medicine. It was thoroughly studied for the portions related to Qarabadeen. The observations were noted and analyzed keeping in view the present status of Pharmacopeias.

2.1. History and Evolution of Unani Pharmacopoeia

In Greece Chiron is said to be the earliest pharmacist. Then emerged Aesculapius in around first century A.D., he is said to be Chiron's disciple but Aesculapius is much more famous than his teacher. He is regarded as an authority on pharmacopoeia. A few decades later appeared Hippocrates (460 B.C.). On account of his tremendous contributions to medicine and pharmacy he is accredited as the father of medical science. In his Pharmacopoeia contributions he has described 400 simples Drugs (Akbarabadi, 1998). Succeeding Greece produced various other Pharmacopoeias.

Most outstanding among them were Dioscorides and Galen of the first and the second century AD., respectively. According to Roman, Dioscorides was by his time the most prominent Pharmacopian. Similar is the view held by the authors of a dictionary of Scientific Biography. They have noted that his most remarkable contribution "De Materia Medica" (Arabic: Kitab-ul Hashaish) bears an account of 600 medicinal herbs, 35 animals and 90 minerals (Saad and Said, 2011; Steinhagen, 2011). A century later, Dioscorides was followed by another outstanding medical practitioner, Galen (130-200 A.D). He authored altogether 129 books, which bear Pharmacopoeic material also. An exclusive book on pharmacopoeia is named as the book on simple drugs named in Latin as “De Simplicium Medicamentorum” (Arabic: Kitabul Adwiyat-ul Mufradah). After Galen, progress of Greek medicine got blurred in its homeland. The pharmacopoeic contribution of Oribasius (325-405 A.D.) was the only exemption to this static situation (Saad and Said, 2011). After a lapse of over five centuries, when the Islamic world turned towards medicine they learnt it primarily from the Greek sources and secondarily through the Persian and Indian sources.

Through their devotion and enthusiastic activity they made exemplary headway in this field and produced hundreds of eminent physicians. They made immense original contributions in the medical discipline. Many of them compiled pharmacopoeias, which are to date, applauded. The earliest medical book that contains Pharmacopoeic materials, besides medical information are respectively, Masarjuwaih's Kunnash, Theadhoq's Kitabul Abdalul Adwiya, Hubaish A'sam's Kitabul Adwiya Mufradah, Ibn Rabban Tabari's Firdausal Hikmah, Zakaria Razi's Qarabadin and Kitab Saidnah. Next in chronological order is the “Materia Medica” and Kitabul Adwiya of Yaqoob Al Kindi (b.850 AD., Kufa). The Materia Medica (Arabic: Aqrabadhin) has recently been discovered. Lewi has edited the book. It contains an account of several hundred simples and compounds. Subsequent to Al-Kindi, numerous Pharmacopians emerged in the Islamic world. Prominent among them were Zakarya Razi,

Ali Ibn Abbas al-Majusi, Ibn Sina, Ibn Rushd, Ibn al-Jazzar, Ibn Zohr, Al-Biruni etc. Majusi's Kitabul Mulki, Ibn Sina's Risala Adwiyatul Oalabia and Canon (5th Vol.), Ibn Rushd's Kulliyat, Ibn al-Jazzar's Zaadul Musafir, AI-Itimad and Kitabul Fuqrah, Ibn Zohr's AI-Taysir and AL-Biruni's Kitabus Saidna are exclusively or partially pharmacopoeic. Although Al-Biruni had never been a medical practitioner, The Kitabus Saidna is a marvelous Pharmacopoeic compilation. Most eminent among, them was Ibn al-Baitar. His contributions, Kitabul Jami AI-Adwiya and Kitabul Mughni got long lasting fame. The contributions of Ibn Juljul's Tafsir Asmaul Adwiya AL-Mufradah Min Kitabe Dioscorides, Ibn Wafid's Kitabul Adwiya Mufradah and Mujarrabatfi Tibb and AL-Ghafiqi's Al- Adwiyah Mufradah are no less admirable (Saad and Said, 2011; Steinhagen, 2011).

In Irani period an Iranian Pharmacopeia Abu Mansur Muwaffiq of Herat composed a pharmacopoeia. In this formulary he described as many as 585 drugs. Another eminent Pharmacopian was named Haji Zainuddin AI-Attar. He was born in 1329 A.D in Shiraz. One of his, notable preparations was an electuary made of newts (Reg Mahi) that happened to be aphrodisiac. Muzaffar bin Mohammad AI-Hussaini Al-Shifai composed a pharmacopoeia in 1556 under the title Tibb-e-Shifai.

In India the Greek medicine was introduced with the advent of Muslim rule over this sub-continent and flourished largely during the Mughal period (1526-1857A.D). Among the earliest 'Indian' Pharmacopeia's was Bahaud Daula of Iranian origin. Among other eminent Pharmacopians of the Muslim Indian period were Hakim Abut Fateh Gilani, Hakim Akbar Shah Arzani and Mirza Hashim Alavi Khan. Another Iranian immigrant, Hakim Ainul Mulk Shirazi compiled a pharmacopoeia entitled 'Alfaz ul-Advia. Numerous pharmacopoeias were also compiled. Most outstanding among them are Qarabadhin Azam by Hakim Azam Khan, Khazanatul Adwiya by Hakim Najmul Ghani Khan, Qarabadhin Baqai by Hakim Baqauddin, Qarabadhin Zakai by Hakim Zaka, Qarabadhin Shifai by Hakim Shifa Khan, Qarabadhin Akbari and Qarabadhin Oadri by Hakim Akbar Arzani, Qarabadhin Haziq by Hakim Muhammad Hasan Merathi, Qarabadhin Kaukabi by Hakim Niaz Muhammad Khan, Qarabadhin Latifi by Hakim Abdul Latif, Bayaz-e-Kabir by Hakim Muhammad Kabir-ud-deen, Tibbi Pharmacopoeia Hakim Muhammad Hasan Qarshi, Hamdard Tibbi Pharmacopoeia and numerous others Pharmacopoeia (Akbarabadi, 1998; Preckel, 2015).

3. Observations and Results

The pharmacopoeia in Traditional Unani system of medicine can broadly be categorized into three categories; the official pharmacopoeia, unofficial pharmacopoeia and non-official pharmacopoeia. The official pharmacopoeia is issued and regulated by Government of the respective countries usually contains separately the simples and compounds drugs of either herbal, or animal or mineral origin or in the combined form as well. The unofficial pharmacopoeias also follow the pattern as of official pharmacopoeia in text and presentation but these are published by organization in private capacity and have retained the word pharmacopoeia; such as Hamdard pharmacopoeia and Qarshi pharmacopoeia can be cited as the examples. However non-official pharmacopoeia are those books in which simples and compound drugs of herbal, animal and mineral origin are organized systematically but as such have not utilized the name or the word pharmacopoeia. But individually and in private capacity have presented the text in medicine and in their contents, design and presentation of manuscript directly and indirectly followed the pattern of unofficial pharmacopoeia and presented the drug to be referred and utilized clinically in its manifestation which is useful as pharmacopoeia is broader perspective.

However, a note of clarification seems to be necessary that many books on Moalijat (Medicine) contain pharmacopoeial descriptions and enumeration of drugs based either on Mufradat (simples) or murakkabat (compound). The examples of these books are: Haziq by Hakim Ajmal Khan, Kanz-ul-Ilaj

by Hakim Mohammad Rafiq Hijazi, Makhzanul Hikmat by Ghulam Jilani and Tazkirah-e-Jalil by Hakim Jalil Ahmed.

3.1. Non-Official Pharmacopoeia

Asal Bayaz Nooruddin by Hakim Nooruddin Printed in Wazeer Hind Press, Amritsar in 1928: This is a typical pharmacopoeia which did not contain either the contents or index. This book is basically classified on the basis of diseases and there in compound and simple preparations has been recommended. In addition sometimes allopathic drugs (herbal, chemical and mineral origin) have also been written (Nooruddin and Abdusalam, 1928).

Bayaze Hakim Ajmal Khan: Translated by Hakim Khawaja Rizwan Ahmad. This book is written in a style of pharmacopoeia but has the features of other Murakkabat's books. This is one of the classical examples of Murakkabat pharmacopoeia which is quite unique in Unani Tibb. In this pharmacopoeia the drugs are classified under the heading of diseases in alphabetical order but detail mentioned is quite different from Murakkabat formulations. This is one of the authentic works which requires an English translation of its own for wider circulation of compound pharmacopoeial preparation (Khan).

Bayaz-e-Kabeer by Hakim Kabeeruddin: This book comprise of three volumes. Volume I indicate the diseases from clinical and therapeutic perspective, but at the end of each chapter on diseases, some formulations are recommended in a brief manner for curative purpose. However, volume II is actually the basic document on pharmacopoeia of Murakkabat, which is quite extensive. The different compendial preparations are given in an alphabetical manner. The different formulations presented contain the quantity and process to prepare the compound formulations. Volume III consists on manufacturing of Unani medicine, different methods and techniques applied are given to prepare different formulation described in earlier volumes I-II. The volume III is rather on Unani pharmacy only (Kabeeruddin, 1929).

Bayaz-e-Waheedi by Hakim Syed Rahman: Published by Shifa-ul-Mulk Memorial committee, Aligarh in 1974. This book contains the contents whereas index is missing. However, this is basically a very good effort to enumerate the latest single ingredient simple formulation according to the diseases. The different chapters are classified according to the diseases of the organ (Rehman, 1974).

Murakkabat Hakim Khuwaja Rizwan Ahmad: This book seems to have been adopted from the words of Bayaze Kabir Dehli kay Murakkabat by Hakim Mohammad Kabiruddin, a little bit in a refined form but in way is a replica. However, the Murakkabat are given as the account of uses and formulations and purely based on the manufacturing aspect of Murrakab dosage form design (Ahmed, 1982).

Firdous al-Hikmat, Abul Hassan Ali-bin-Sahal-bin-al-Raban Tabri: Translated by Hakim Ashraf Nadvi wrote this book which contains two parts comprising of part - I with 12 chapters and part - II with 13 chapters. This book is on clinical medicine and therapeutics. Besides that it has enumerated different drugs for use in different disease (Tabri, 2010).

Qarabadeen Lutfi, Hakim Abdul Sattar Lutfi: This book is written from the point of view of Mujarrabat, which literally means experimental medicine. However, being written in traditional pharmacopoeial style, it was further designated as Qarabadeen. In this way nothing has been concealed as for the uses and dosage of these different types of medicinal formulation, which are quite authentic in usage and medicinal utilization for preventive and curative purpose. Another salient

feature of this book is the temperament determination, which has been suggested both for Mufradat and Murakkabat. All the different formulations in different dose design are arranged alphabetically (Lutfi and Qurabadeen, 1924).

Kanz-ul-Murakkabat, Hakim Muhammad Abdullah: This book is on Murakkabat based on formulations derived from different Qarabadeen. The dosages are mentioned according to modern scale however, the timing of medication is missing. A special attention has been paid to include those simples in Murakkabat, which are available in the market. The texts are in alphabetical index and moreover the dosage forms of Murakkabat are also given in alphabetical indexing for quick and easy reference (Abdullah).

Kitab Mustajab Urf Akseer Mardan Masihaay Sadiq, Hakim Karim Baksh: This is typical pharmacopoeia on sexual disorders of man. After evaluating the formulations, it appears that guidance is provided to practitioners. In the introductory part the text contains the information of human reproductive system and organs; there effects on different body function for example heart and brain etc are noted. In continuity the details of different sexual functions are described. In this pharmacopeia formulations for the diseases of other systems are missing (Baksh).

Kitab-ul-Murakkabat-wa-Ilaj-ul-Amraz, Hakim Muzaffar Hussain Aawan: It is claimed that the Murakkabat presented in this book are as old as one thousand years. This book is alphabetically arranged and contains Murakkabat in all types of dosage form design like syrups, Majun, Sanoon, tablets etc. It has been claimed that there are lot books on Murakkabat which indicated lot of preparations which are not in current use or have been declared obsolete for want of evidence for the particular treatment. Therefore, in this book only selected types of Murakkabat are enlisted which have their utility in the treatment and are beneficial (Awan, 1957).

Makhzan-ul-Murakkabat by Dr. Ghulam Jilani: In this book along with different formulations, the procedures for making these Murakkabat are also cited. The different Murakkabat are given in alphabetical indexing. According to chemical point of view such as decomposition, lixiviation, desiccation, sublimation and other type of terminology used in pharmaceutics are presented with examples. At the end Murakkabat are categorized according to pharmacological action are given in a comprehensive manner (Jilani, 1945).

Qarabadeen Qadri, Hakim M. Akbar Arzani: Qarabadeen Qadri literally meaning the pharmacopoeia of Qadri containing Murakkabat which are generally utilizes for the treatment of different diseases. The book contains different types of treatment in lay man's language. The chapters on different diseases are then classified in each chapter's alphabetically. This book is quite famous from clinical therapeutics perspective and at the end the manufacturing of Murakkabat is also reported. The toxic medium and their implications have also been mentioned in the last chapter where in animal and mineral toxic medicinal agents show their adverse effect for the substances; antidotes have also been suggested (Arzani, 1907).

Qarabadeen Shifai written by Hakim Muzzaffar Bin Mohammad Al-Hussaini Al Shifiai: The different chapters are indexed alphabetically and there in only compound (Murakkabat) formulation are given in quite detail. This appears one of the old texts where typical nomenclature and complex in its citation are given which is characteristic in its style and represent the excellence of selection of higher order of words. Both contents and index are not provided (Shifiai).

Tartib-ul-Adviah by Hakim Kabiruddeen: Classification of drugs according to pharmacological action and diseases are mentioned. This book is one of the foundation books which have classified the different simples and a compound drug used in Unani Medicine and provides a glossary of materia medica in concise form. This can be compared to as Pharma-guide in style of presentation, except that the drugs used in this book are generic in nature (simples) as well as compound formulations (Kabiruddeen).

Tazkara-e-Jalil, Hakim Hafiz Jalil Ahmad: Basically this book is written from the diseases point of view and represents the different formulations for the different body system. Though many of the formulation extracted from the authors of well known books of the eminent authors; however, it is very difficult to verify that different formulations and prescriptions present in this book (Ahmad, 2008).

Tibbi Pharmacopoeia, Hakim M. Hassan Qarshi: In this pharmacopoeia, drugs of herbal, animal and mineral origin are cited. The salient features of this book are further compounded by the fact that the part of traditional drugs utilized in Unani system of medicine have been presented and these are indexed in alphabetical order more from compound preparation point of view. The third part gives the latest allopathic listing. As a further expansion of the pharmacopoeia; contents of some drugs Ayurvedic pharmacopoeias are given. Then the drugs of animal origin and lastly the extraction of different herbal drugs containing essential oils, syrups, kushta, liniments and collyrium are given. If this pharmacopoeia is to be reviewed then it can be said that from the presentation and style of contents, it rather has followed an integrated approach to mix up the traditional and allopathic medium together for the treatment of different ailments (Tibbi Pharmacopoeia, 1975).

3.2. Un-Official Pharmacopoeia

Kitabul-Mujarrebat (Muntakhab Mujarrebat Atibba-e-Pakistan): Authentic unofficial Pharmacopoeias, was prepared by different Hakims of Punjab, Sindh, Baluchistan and NWFP and Azad Kashmir. This book first of all provides the detail of diseases in alphabetical order, thereafter drugs utilized again in alphabetical indexing. The context of this publication is exactly like that of traditional pharmacopoeia. But again this pharmacopoeial compilation is on Murakkabat only (Mujaebat, 1976).

Qarabadeen-e-Najm-ul-Ghani, Hakim Mohammad Najm-ul-Ghani: In this book, the author has listed alphabetically the different dosage form and there in cited the compound preparation. All the formulation ingredients are repeated and some of them are based on the clinical practice. This book has been referred as a standard text of pharmacopoeia of Murakkabat in many of the recent citation of the pharmacopoeia being published by different authors. It contains innumerable preparation almost on every type of disease. Although this Qarabadeen was published in 1919 but till to date this rated quite high and famous among the Hakims and physician of Unani medicine and is supposed to be an authentic work (Ghani, 1945).

Hamdard Pharmacopoeia of Eastern Medicine, Ed: "Hakim Muhammad Said": Hamdard Pharmacopoeia of Eastern Medicine is one of the latest pharmacopoeia where in exhaustive list of drugs introduce by Arabs in their materia medica, indigenous drugs used in Unani system of medicine, indigenous medicine of drugs of Indian origin, animal and mineral drugs, common drugs utilized both in Ayurvedic and Unani medicine, list of simples as mentioned by Ibne Sina in his book Cannon, drugs used only either in Unani or Ayurvedic medicine, drugs of vegetable origin, list of drugs according to their geographical distribution both India and Pakistan and classification of drugs

according to their pharmacological and medicinal utilization are enumerated. After these listings, then pharmacopoeias as standardized by Hamdard starts, where in drugs are classified (Said, 1969).

3.3. Official Pharmacopeia

Monograph of Unani Medicine: This document brings together valuable scientific material providing a systematic characterization of a large number of herbs with a summary on their active constituents, functions and properties, pharmacological activities and side effects. This scientific information will promote the safety, efficacy and quality of traditional medicine practices in the country. It will also assist in setting objective regulatory and quality assurance standards necessary for the rational use of these herbs. This technical document will also substantiate the relevance of the ongoing national efforts aiming at the development of a national policy on traditional medicine. WHO supports to the development of this monograph with the aim to save lives and improve health by closing the huge gap between the potential that essential drugs have to offer and the reality that for millions of people, particularly the poor, medicines are unavailable, unaffordable, unsafe or improperly used (Monograph of Unani Medicine).

Tibbi Pharmacopoeia

Approved from Board of Unani and Ayurvedic System of Medicine, Pakistan Act II-1965 has Alphabetical indexing of Mufradat, medical terms, pharmaceutical manufacturing terms, measures of weight, stability of drugs, expiry of drugs, identification of drugs, Murakkabat antidote stabilization, Dosage form, drugs acting on biological system (pharmacology). In Tibbi Pharmacopoeia altogether 1285 Mufradat and 630 Murakkabat are described (Tibbi Pharmacopoeia, 1965).

British Herbal Pharmacopoeia 1996

The British Herbal Pharmacopoeia 1996 provides monographs of quality standards for 169 herbs commonly used in the United Kingdom for the preparation of botanical drugs. To avoid duplication of work, some of the monographs in this volume have been abbreviated, making reference to the official monograph where appropriate. Particular attention has been paid to developing thin-layer chromatographic techniques for comparative identification of the new botanical drugs. Quantitative analysis for active principles has not been included in the monographs because, in most cases, it is not possible to determine individually active components within an herb. Herbs are composed of a complex and synergistic mixture of active compounds which rarely have the same potency when isolated (British Herbal Pharmacopoeia, 1996).

British Herbal Compendium, Vol. I

The British Herbal Compendium is a handbook of technical information on the plant drugs for which quality standards are defined in the revised British Herbal Pharmacopoeia (BHP). With its depth of content and unique combination of features, the Compendium should prove useful in many areas of herbal medicine. Monograph titles and definitions of plant drugs in the Compendium are in accordance with the revised BHP apart from minor changes, notably inclusion of the botanical family name within each definition. Thereafter, with an occasional introductory passage, each monograph comprises sections on Constituents, Therapeutics, Regulatory Status and References. In many cases, the actions and uses described in the literature are largely based on unpublished observations or common experience, often valid but requiring a cautious approach (British Herbal Compendium, 1990).

British Herbal Compendium Vol. II

The British Herbal Compendium Volume 2 serves as a companion volume to the BHP 1996, covering those herbs not included in Compendium Volume 1, but also complete in itself. Volume 2 will use the same format as Volume 1, but includes expanded sections on pharmacology and therapeutics thoroughly referenced with the most up to date research available (British Herbal Compendium, 1990).

4. Discussion

In spite of the availability of these pharmacopoeias the preparations of prescriptions and medicines are still fraught with practical difficulties in the field of dawasazi as well as in clinical prospective; some of which are enumerated below:

- These pharmacopoeias give the names of the Greco-Arab medicines in Arabic. The pharmacist has to search for the vernacular equivalent in tibbi dictionaries and glossaries.

- The weights of the individual medicines to be incorporated in a medicinal mixture were given in measures a few centuries ago, and the dispenser, in converting these measures to those in usage, was faced by the prospect of considerable-and rather unnecessary drudgery.

- The pharmacopoeias available do not give a full and comprehensive account of the preparation of medicinal mixtures, and therefore the dispenser did not receive full guidance in this regard. For example proper duration and temperature for preparing Arq, Zimad, Sharbat and Roghan is not mentioned in any Qarabadeen.

- Drugs bearing synonymous names were vigorously described as to preparations, with the result that it became increasingly difficult to determine the correct drug to be included in the preparation.

- Shelf-life and adverse effects are mentioned in only few pharmacopoeias for only some compound drugs.

- Different pharmacopoeias are followed for drug formulation in different region. So there are no similarity between the same compound drugs in terms of effects and side effects due to variability of ingredients.

- From clinical prospective proper dose and dosing pattern is not mentioned in satisfactory manner. So these pharmacopoeias cannot be referred in general practice.

- All that one could safely state is that the compilers of these pharmacopoeias did not adopt a practical approach. These pharmacopoeias failed to grasp the significance of many of the medicinal components and could scarcely be expected to offer full guidance to the dispenser as well as practitioner.

These problems have been resolved through compromise, but compromise can never be a solution.

To solve these problems, fifty years ago a few concise pharmacopoeias were compiled. But these pharmacopoeias succeeded in resolving at least a few problems only out of the many, and these still

persist Therefore, it became essential both for Unani practitioner and Tibbi institutions/associations to come and grips with these all-important problems.

5. Conclusion

With extensive research work on different official and unofficial pharmacopoeias it may be concluded that Hamdard Pharmacopoeia of Eastern Medicine is the most latest and standard text. However it appears that quality control assurance techniques standards should also be incorporated in the text so as to prove its worth from advanced and scientific point of view.

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Shelf Life of Ayurvedic Dosage Forms in Regulatory Perspectives

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Abstract Ayurveda is an ancient (since 1000 B.C.) system of traditional medicine in India. It is not only practised in India even practiced globally as a complementary and alternative medicine system. Ayurveda defined enormous formulations belongs to different *Bheshaj Kalpana* (dosage forms) out of which *Svarasa* (juice), *Kalka* (paste), *Shruta/Kvatha* (decoction), *Sheeta/Hima* (cold infusion) and *Phanta* (hot infusion) can be considered as basic/primary dosage forms and few other dosage forms e.g. *Churna* (powder), *Vati* (tablet/pills), *Tail/Ghrita* (medicated Oils/Clarified butter), *Asava* and *Arishta* (self-generated alcoholic preparations) and *Avaleha* (electuary/semisolid confectionary) considered as secondary dosage forms derived from primary dosage forms. The *Saviryta Avadhi* (shelf life) of the basic dosage forms are considered as 03 hrs while the shelf life of derived dosage forms is varied as the later mentioned formulations comprises complicated specified Ayurvedic medicine processing and inclusion of natural preservatives also. In the current scenario, the amendment of Rule No. 161-B of Drugs and Cosmetic Act 1940, specify the maximum shelf life or date of expiry; unless otherwise determined on the basis of scientific data of an Ayurveda medicine defined under clause (a) of section 3 of the Act. This rule also stated that the Ayurvedic medicine defined under clause (h) of section 3 of the Drugs and Cosmetic Act 1940, the scientific data based shelf life based on the Real-time stability studies of medicines should be derived in accordance with the guidelines prescribed in Ayurvedic Pharmacopeia of India Part I, Vol III.
Keywords *Saviryta Avadhi (shelf life); dosage forms; Ayurvedic Pharmacopoeia of India (API); Drugs and Cosmetic Act 1940 (D & C Act 1940); Ayurvedic; Siddha or Unani (ASU)*

1. Introduction

The Ayurveda system of medicine primarily inscribe five basic dosage forms i.e. *Svarasa* (juice), *Kalka* (paste), *Shruta/Kvatha* (decoction), *Sheeta/Hima* (cold infusion) and *Phanta* (hot infusion) involving simple pharmaceutical processing, on the basis to be prescribed to different *Prakriti* (Natural constitution) of patient and severity of the disease. These medicines are generally prepared by the physicians/patient and more specific for the patient's diseased condition as well;

these preparations are difficult to intake because of its palatability. Also, those preparations are perished within very short period i.e. within 03 hours, so have to be prepared frequently since these preparations generally derived from fresh forms of the different herbs and are semisolid/liquid in nature. While subsequently secondary derived dosage forms e.g. *Churna* (powder), *Vati* (tablet/pills), *Tail/Ghrita* (medicated Oils) *Asava* and *Arishta* (self-generated alcoholic preparations) and *Avaleha* (electuary/semisolid confectionary) were evolved, these are generally poly-herbal in nature and encompasses the more specific Ayurvedic pharmaceutical processing & incorporation of natural preservatives contributes to possessing longer shelf life and these preparations having better palatability, easy to administration in the weak/young/child/female patients. Later on, *Rasa Shastra* scholars inculcate *Bhasma* (incinerated Metals/minerals), *Rasayoga* (formulations containing Parad (mercury) or its compounds/ *Bhasma* of different metals/minerals/precious stone/animal products with/or without herbs) which are more potent, fast acting and used in the lesser dose and comprises the very long shelf life also.

2. Concept and Shelf Life of Ayurvedic Dosage Forms

The concept of *Virya* (Potency) of the various Ayurvedic dosage forms explained in various Ayurvedic texts and signify that the *Saviryta avadhi* (time period of the Potency or Shelf life) is the specified period during which the *Virya* (Potency) of the drug remains or it is the time limits by the which the drug reduces its original potency up to some extent and should be recommended for prescription before lapse of that specified period of time (Sastri, K.N. & Chaturvedi, G.N., 1969; Charaka Samhita with commentary & Acharya Jadhavji Trikamji Vaidya, 1980; Susruta Samhita with commentary). The main factors affecting the Shelf life are derivation of the drug, dosage forms, environmental factors (humidity, temperature, light), microbial contamination, storage conditions & packaging system etc.

Table 1: *Shelf life of various Ayurvedic Dosage forms at a glance as referred in Ayurvedic Texts*

S.N.	Ayurvedic Dosage forms	Ayurvedic Texts		
		Sarangdhara Samhita [a]	***Vanga Sen*** [b]	***Yogaratnakar*** [c]
1.	*Svarasa*	-	-	01 *Prahar* (3hrs)
2.	*Kalka*	-	-	01 *Prahar* (3hrs)
3.	*Shruta/ Kwatha*	-	-	01 *Prahar* (3hrs)
4.	*Sheeta/Hima*	-	-	-
5.	*Phanta*	-	-	-
6.	Churna	02 months	-	3 months
7.	Vati	12 months	-	-
8.	Guda/Avaleha	12 months	12 months	06 months
9.	Ghrita & Taila	16 months	06 months	12 months
10.	Asava (Arishta also)	Infinite (or may be more potent as gets older)	-	-
11.	Dhatu	-do-	-	-
12.	Rasa	-do-	-	-
13.	Anjana	-	-	3 months

[a] Sastri Parshuram, 1983, The Sharangadhara Samhita with commentary
[b] Rai Rajeev Kumar, 1983, Vangasen
[c] Shastri Lakshmipati, 1973, Yogaratnakar

3. Current Scenario of the Shelf Life of Ayurvedic Medicine

Till 2009, Rule No. 161, of the D & C Act, which was dealt with the rules applicable for the Labelling, Packing and limit of alcohol for the ASU medicine, did not obligatory specify to declare the Shelf life of the ASU medicine on the label of the product; only date of manufacture (For this purpose the date of manufacture shall be the date of completion of the final products, or the date of bottling or packing for issue) is sufficient with the other mandatory requirement like name of the product, licence no., batch no., reference of the product, true list of the ingredients etc.

In the year 2009 the Department of AYUSH (Now Ministry of AYUSH) under Ministry of Health and Family vide G. S. R. 764 (E) dated 15th Oct. 2009 (Anonymous, 2009, The Gazette of India, Extraordinary Part-II, Section 3), incorporates the Rule no. 161-B referring the shelf life of the ASU medicine, in the Drugs and Cosmetic Act 1940 (D & C act 1940) and Rules made thereunder, which is now further revised vide G. S. R. No. 789(E), dated 12th August, 2016 2009 (Anonymous, 2016, The Gazette of India, Extraordinary Part-II, Section 3) by the Ministry of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (Ministry of AYUSH), New Delhi and amend the Rule No. 161-B of D & C act 1940 and Rules 1945, applicable for the rules for shelf life of Ayurvedic, Siddha and Unani drugs. The focal points are as follows:

1: (1) These Rules may be called the Drugs and Cosmetics (5th Amendment) Rules, 2016.
(2) They shall come into force on the date of their publication in the Official Gazette.

2: In the Drugs and Cosmetics Rules, 1945, for rule 161-B the following rule shall be substituted, namely:-

"**161-B. Shelf life or date of expiry of medicines**

(1) The date of expiry of Ayurvedic, Siddha or Unani (ASU) medicines shall be conspicuously displayed on the label of container or package of ASU medicine, as the case may be and after the said date of expiry, no medicine shall be marketed, sold, distributed or consumable.
Provided that this rule shall apply to ASU medicines seeking licence or renewal of licence for manufacturing after the date of notification of the rules.
Provided also that this rule shall not be applicable to the ASU medicines manufactured and marketed prior to the date of this notification.

(2) Every person applying for licence or renewal of licence for the manufacturing of ASU medicines defined under clause (h) of section 3 of the Act (i.e. patent & proprietary ASU medicines), shall submit to the State Licensing Authority scientific data based shelf life or date of expiry of the medicine based on the Real-time stability studies of medicines in accordance with the guidelines prescribed in the Ayurvedic Pharmacopoeia of India (API).
Provided that this sub-rule shall be applicable after three years from the date of notification of the rules.

(3) The guidelines regarding stability studies as prescribed in the API, Part-I, Volume-VIII shall be applicable to all the medicines of ASU.

(4) The State Licensing Authority shall, before granting license or renewal of license for an ASU medicine, ensure validity of the data submitted by the manufacturer in support of the claimed shelf-life of that medicine.

(5) The State Licensing Authority may at any time direct the manufacturer to provide the samples of the medicine and any other related information; and may share it with the

Pharmacopoeial Laboratory for Indian Medicine (PLIM), Ghaziabad for analysis or independent validation.

(6) Where the manufacturer fails to comply with direction of the State Licensing Authority under sub-rule (5), the license for the manufacturing of the medicine shall be liable for suspension after giving a reasonable opportunity of being heard.

(7) Any person aggrieved by an order passed by the State Licensing Authority under sub-rule (6), may within sixty days of such order, appeal to the Central Government, and the Central Government may, after such enquiry into the matter as is considered necessary, pass such order in relation thereto as it deems fit. The decision of the Central Government shall be final and binding.

(8) The shelf life or date of expiry of an Ayurvedic medicine defined under clause (a) of section 3 of the Act shall, unless otherwise determined on the basis of scientific data, be as follows (Table 2).

Table 2: *Showing the Shelf life of Different Ayurvedic Dosage forms as mentioned in Rule No. 161 B the D & C Act*

S. No.	Name of the Group of Ayurvedic Medicine	Shelf life as of Ayurvedic medicines	
		as per pre-revised Rule 161-B vide G.S.R. 764 (E) [a]	as per revised Rule 161-B; vide G.S.R. No. 789 (E) [b]
1.	Churna, Kwatha Churna	2 years	2 years
2.	Gutika (Vati-Gutti, Pills, Tablets except Gutika with Rasa)	3 years	(explained in S. No. 37)
3.	Gutika Tablet containing Kasth aushadhi,	3 years	
4.	Gutika, Tablet containing Kasth aushadi and Rasa, Uprasa, Metallic Bhasmas, and Guggulu.	5 years	
5.	Rasaushadhies	No expiry date[1]	(explained in S. No. 38)
6.	Asava-Arista	No expiry date[1]	10 years
7.	Avaleha	3 years	3 year (Includes Khanda, Paka, Guda also)
8.	Guggulu	5 years	5 years
9.	Mandura - Lauha	10 years	10 years
10.	Ghrita	2 years	2 years
11.	Taila	3 years	3 years
12.	Arka	1 year	1 year
13.	Dravaka, Lavana, Ksara	5 years	5 years
14.	Lepa Churna	3 years	2 years
15.	Dant Manjan Powder	2 years	2 years
16.	Dant Manjan Paste	2 years	-
17.	Lepa Guti	3 years	(explained in S. No. 37)
18.	Lepa Malahar (Ointment)/Liniment/ Gels/lotions /creams	3 years	Malahar - 3 years
19.	Varti	2 years (one time use)	2 years
20.	Ghana Vati	3 years	(explained in S. No. 37)
21.	Kupipakva Rasayan	No expiry date[1]	10 years
22.	Parpati	No expiry date[1]	10 years
23.	Sveta parpati	2 years	2 years
24.	Pisti and Bhasma	No expiry date[1]	Pishti and Bhasma except Naga, Vanga and Tamra Bhasma – 10 years

25.	Svarna, Rajata, Lauha, Mandura, Abhraka bhasma, Godanti, Shankha Bhasma, etc.	No expiry date[1]	(explained in S. No. 24)
26.	Naga Bhasma, Vanga Bhasma, Tamra Bhasma[2]	5 years[2]	5 years
27.	Capsules made of soft gelatin (depending upon the content material) for Kashtha aushadhi	3 years	-
28.	Capsules of hard gelatin (depending upon the content material) -containing Kasth aushdhi with Rasa, Bhasma, Parad-Gandhak	5 years[2]	-
29.	Syrup/liquid oral	3 years	-
30.	(Karna/Nasa Bindu) Ear/Nasal drops	2 years	2 years
31.	Eye drops	1 year	1 year
32.	Khand/Granule/Pak	3 years	(explained in S. No. 7)
33.	Dhoopans-Inhalers	2 years	2 year
34.	Pravahi Kwatha (with preservatives)	3 years	Pravahi Kwatha- 3 years
35.	Anjana	-	
	a) Anjana made from Kasthaushadhi		1 year
	b) Anjana made from Kasthaushadhi along with Rasa/Uprasa/Bhasma		2 year
	c) Anjana made only from Rasa/Uprasa/Bhasma		3 year
36.	Sharkar / Panak/Sharbat		3 year
37.	Gutika/Vati	-	
	(I) Gutika or Vati containing Kasthaushadhi along with Rasa / Uprasa / Bhasma/ Guggulu (including Lepa Gutika and Ghan Vati)		5 years
	(II) Gutika or Vati containing only Kasthaushadhi (including Lepa Gutika and Ghan Vati)		3 years
	(III) Gutika / Vati containing only Ras /Uprasa /Bhasma except Naga, Vanga and Tamra Bhasma		10 years
38.	Rasayoga	-	
	(I) Rasayoga containing only Rasa / Uprasa / Bhasma except Naga, Vanga and Tamra Bhasma		10 years
	(II) Rasayoga containing Rasa / Uprasa/ Bhasma along with Kasthaushadhi/Guggulu		5 years
39.	Sattva (derived from medicinal plant)	-	2 years

[a] Anonymous, 2009, The Gazette of India, Extraordinary Part-II, Section 3
[b] Anonymous, 2016, The Gazette of India, Extraordinary Part-II, Section 3

Note 1. Item at Sr. No. 5, 6, 21, 22, 24, 25 have very long shelf life and they became more efficacious with the passage of time and period of ten years shall be mandatory for keeping the records of such items.

Note 2. Bhasmas at Sr. No. 26, start solidifying after five years and they need one or two Puta again before using in the dosage form.

4. Estimation of Shelf Life of Ayurvedic Dosage Forms

It was constantly demand from the manufacturers of Ayurvedic medicines that which guidelines should be adopted for the assessment of the shelf life of the Ayurvedic medicines, as it is mandatory that shelf life to be displayed on the label of the Ayurvedic products. Now as specified in the revised Rule No. 161-B of the D & C Act 1940, that the estimation of the scientific data based

shelf life or date of expiry of the ASU medicine, should be based on the Real-time stability studies of medicines in accordance with the guidelines prescribed in the Ayurvedic Pharmacopoeia of India (API), Part-I, Volume-VIII and it is applicable to all ASU medicine. The guideline as described in the API Part I, Vol. VIII, appendix 3.9 covers almost all the aspect of the factors which should be taken into the account for the assessment of shelf life or the date of expiry of an Ayurvedic medicine e.g. general information, scope, approach towards selection of the batch of the medicine for the newly developed and existing marketed products, closure systems, specifications i.e. Analytical parameters (organoleptic, physical and physico-chemical parameters) criteria for the identity, purity and strength of the product under study, testing frequency, storage conditions (temperature, relative humidity, light) maintained under the Stability Chambers used for the Accelerated/ Real time stability studies and evaluation of the shelf life on the basis of the testing results.

4.1. Guidelines for Estimation of Shelf Life as Prescribed in API Part I, Vol. VIII, Appendix 3.9

(Anonymous, 2010, The Ayurvedic Pharmacopoeia of India, Part I, Vol VIII)

4.2. Stability Testing and Shelf Life Determination for New and Existing Ayurvedic Drugs

(This guideline is not limited only to ASU extracts covered under this volume of API. It shall be applicable to all the licensed ASU medicines)

4.3. Scope and Objective

The objective of this guideline is to specify the method of arriving at shelf life by stability testing. The shelf life determined by the process mentioned in this guideline can be used to decide the expiry date, in case a manufacturer wishes to assign a shelf life longer than one specified by the notification G.S.R. 764 (E) dated October 15, 2009 *(now G.S.R. 789(E), dated 12th August, 2016 - as per revised rule 161-B should be considered).*

The guideline can be used for all patented and proprietary Ayurvedic medicines, both new and existing products.

5. General Information on Stability

Information of shelf life (expiry date) is mandatory requirement for all licensed Ayurvedic medicines. The stability depends on various factors like the nature of the product, the ingredients of the products, the packaging material etc. Stability studies are carried out to demonstrate that the medicine will remain suitable for consumption during shelf period when stored under the condition(s) mentioned on the packaging. On the product label, if there is no mention about any specific storage condition, then it is assumed that the product can be stored at room temperature (below 30^{o}C). For a suitable drug substance, retest period is more appropriate than expiry date.

The purpose of stability testing is to provide evidence on how the quality of a drug substance or drug product varies with time under the influence of variety of environmental factors such as temperature, humidity, and light, to establish a retest period for drug substance or a shelf life for drug products.

Two approaches can be followed to monitor the stability of the product. The first approach is to store the samples of same batch material at standard storage and accelerated storage conditions and test them periodically. Based on the evaluation of the results, the expiry date or shelf life may be determined.

The second approach is to select samples from batches manufactured over a period of last five years spanning six months and evaluate them simultaneously. Based on the result obtained the expiry date

or shelf life may be determined. This approach is applicable for existing products which do not have yet a declared shelf life. This approach has been referred in scientific literature as the “cross sectional approach”.

5.1. Selection of batches

Formal stability studies should be conducted on at least three primary batches. The primary batches should be of the same formulation as proposed for marketing. For new products, the batches should be manufactured to a minimum of pilot scale by the same route as, and using a method of manufacture and procedure that simulates the final process to be used for production batches. Pilot batches which are at least 1/10 of the commercial batch size can be used. The overall quality of the batches of drug placed in formal stability studies should be representative of the quality of the material made on production scale. Where possible, batches of drug product should be manufactured by using different batches of drug substance. Stability to be performed on each individual strength and container size of the product unless bracketing and matrixing is applied.

For cross sectional approach, at least two batches per year to be selected. For example, if stability to be evaluated for four years eight batches should be selected.

5.2. Container and closure system

The stability studies should be conducted on the dosage form packaged in the container and closure system proposed for marketing (including as appropriate, any secondary packaging and container label). If the container is too large for drug substances the stability studies should be conducted in a container and closure system that is the same as or simulates the packaging proposed for storage and distribution.

5.3. Specification

Specification is a list of tests, reference to analytical procedures and proposed acceptance criteria.

Stability study should include testing of those attributes of the drug that are susceptible to change during storage and are likely to influence quality, safety, and/or efficacy. The testing should cover as appropriate, the physical, chemical, biological, and microbiological attributes. Validated stability-indicating analytical procedures should be applied. Whether and to what extent replication should be performed will depend on the results from validation studies.

The physical parameters included in the specification need not be limited to colour, odour, appearance, shape and taste only. The chemical parameters should include colour reaction, *p*H value, weight variation, disintegration time, bulk density, extractive values, estimation of active or marker or category compound by suitable methods and chromatographic profiling. A suitable bioassay may be employed wherever possible.

The limits of acceptance for the products should be those specified in pharmacopoeia. If limits are not available these should be derived from release specification. Shelf life acceptance criteria should be derived from consideration of all available stability information. It may be appropriate to have justifiable differences between the shelf life and release acceptance criteria based on the stability evaluation and the changes observed on storage. Any differences between the release and shelf life acceptance criteria for antimicrobial preservative content should be supported by a validated

correlation of chemical content and preservative effectiveness demonstrated during development of the product in its final formulation (except for preservative concentration) intended for marketing.

5.4. Testing frequency

For long term studies frequency of testing should be sufficient to establish the stability profile of the drug. For drug with proposed shelf life of at least 12 months, the frequency of testing at long term storage condition should normally be every 6 months over first year, and the second year and annually thereafter through the proposed re-test period or shelf life.

At the accelerated storage condition, a minimum of three time points including the initial and final time points *(e.g.* 0, 3 and 6 months) from a 6 month study is recommended.

Reduced designs *i.e.,* matrixing or bracketing, where the testing frequency is reduced or certain factor combinations are not tested at all, can be applied if justified.

5.5. Storage condition

The world can be divided in to four climatic zones I - IV. This guideline address zone IV. The choice of test conditions defined in this guideline is based on an analysis of the effects of climatic conditions in the zone. Recommended storage conditions are

S. No.	Study	Storage condition	Minimum time
1	Accelerated	$40^{o} \pm 2^{o}$ C / 75 % RH ± 5 %	6 months
2	Long term	$30^{o} \pm 2^{o}$ C / 60 % RH ± 5 %	12 months

Other storage conditions are allowable if suitably justified. For products, which are temperature sensitive, to be stored in lower temperature which will then become the condition designated long term storage temperature. The accelerated testing should be then carried out at least 10^{0} C more than the long term storage condition along with appropriate relative humidity condition for that temperature.

The reference samples for the above study should be stored in a temperature less than 10^{o}C.

5.6. Evaluation

The purpose of stability is to establish, based on testing a minimum of at least three batches of the drug, a retest period applicable to all future batches for the drug substance, or a shelf life and label storage instructions applicable for all future batches of the drug product manufactured and packed under similar circumstances.

An Ayurvedic drug can be considered to be stable if “no significant change” occurs during at any time of testing at accelerated storage condition or at real time storage condition.

“Significant change” for a drug is defined as

1) A + or - 20 per cent change from the initial assay value (If the drug is analysed for its marker). A + or - 15 per cent change from the initial assay value (If the drug is analysed for its active compound).

2) Appearance of new spots in Identification by TLC (when compared with the sample stored in less than 10^{o} C) or completely disappearance of existing spot.
3) The physico-chemical parameters (moisture, ash, particle size) shall not vary beyond 25% of the initial value.
4) Failure to meet the acceptance criteria as per individual monographs or specification.
5) Failure to meet acceptance criteria for appearance (Physical attributes, and functionality tests *e.g.,* colour, phase separation, caking, hardness).

6. Conclusion

The scholars of the Ayurveda indicated the *Saviryata Avadhi* (shelf life) of the different dosage forms and also aware that the in the due course of time, pharmaceutical processing, nature of ingredients and by virtue of other factors the *Virya* (Potency) of the Ayurvedic medicine is tend to reduces and within that specified period the medicine is good for therapeutics. In the current scenario, i.e. revised Rule No. 161-B of the D & C Act 1940, specified the shelf life or date of expiry of an Ayurvedic medicine defined under clause (a) of section 3 of the Act unless otherwise determined on the basis of scientific data. While the aforesaid rule, also specify that the guidelines mentioned in the API Part I, Vol. VIII should be followed for the estimation of scientific data based shelf life or date of expiry of the ASU medicines defined under clause (h) of section 3 of the Act (i.e. patent & proprietary ASU medicines) based on the Real-time stability studies. The prescribed guideline in the API, Part I, Vol. VIII, under appendix 3.9 refers guidelines for the assessment of the shelf life pertinent not only for the Ayurvedic medicine but it is equally applicable for Siddha and Unani medicine also. The guideline mentioned in the API, Part I, Vol. VIII, covers general information, scope and modus operandi for estimation of shelf life e.g. approach for selection of the batches, closure system, specifications i.e. Analytical parameters under consideration, testing frequency, maintenance of internal environmental conditions of the Stability Chambers, evaluation and inference of the shelf life on the basis of the testing results. However, there is a wide gap to establish the shelf life of various classical and patent ASU formulations on the basis of the scientific data as most of the formulations are comprising polyherbal/mineral compounds, absence of studies on interactions between the ingredients, unavailability of the information on active markers, natural attributes of the ingredients and formulations, large number of the marketed products and large numbers of smaller manufacturing industries.

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Review Article

Dynamism of Chanaka (*Cicer aritienum Linn.*) for Human Health: A Review

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Abstract Chanaka or Chick pea is an old world pulse and considered to be better than other pulses because of good source of carbohydrate and protein, and protein quality is considered to be better than other pulses. It has significant amount of all the essential amino acids. It is rich in unsaturated fatty acids such as linoleic and oleic acids. Beta-sitosterol, campesterol and stigmasterol are important sterol present in Chanaka. According to contemporary research based studies show that chick pea fiber source-lowering the risk of cardiovascular disease, diabetes, obesity and other lifestyle disorders. Ancient lexicons say that it is the best among all grams and advocates its use on daily basis. Review on Chanaka (*Cicer arietinum* Linn.) was collected from Kosha, Nighantus and data search on the basis of their synonyms and pharmacological properties. This review throws light on some of the important aspect of Chanaka as an effective health promoter as well as its uses in various lifestyle disorders, which will be more valuable for future researchers and practitioners.
Keywords: *Ayurveda; Bengal gram; Cardiovascular disease; Health; Lifestyle disorders*

1. Introduction

Proper diet is an integral part of Ayurvedic dietetics. Ayurveda provides the first approach that can be helpful in creation and maintenance of perfect health and to alleviate the symptoms of illness. Among three sub-supporters (Ahara~Balanced diet, Nidra~Proper sleep and Brahmacharya~Absitence) Ahara~Balanced diet is the first and foremost pillar of Ayurveda. According to W.H.O., balanced diet that contains the proper proportions of carbohydrates, fats, proteins, vitamins, minerals and water necessary to maintain good health. Ahara is fundamentally preventive in nature and enhances vitality, strength and makes the body sturdy. So the method and quality of taking food should be systematically as described in Ayurveda (Kashinath and Gorakhnath, 2010).

Chanaka (*Cicer arietinum* Linn.) also called as Chick pea or Bengal gram or Garbanzo bean, is a popular lentil in India. Globally, it is mostly consumed as a seed food in several different forms and preparations are determined by ethnic and regional factors (Muehlbauer and Tullu, 1997; Ibrikci et al., 2003). In the Indian subcontinent, Chanaka is split (cotyledons) as dhal and pulverize to make flour

(besan) that is used to prepare different snacks (Chavan et al., 1986; Hulse, 1991). In other parts of the world, especially in Asia and Africa Chanaka is used in soups/salads and consumed in roasted, boiled, salted and fermented forms (Gecit, 1991). These different forms of consumption provide valuable nutrition and potential health benefits. Chanaka has been consumed by humans since ancient times owing to its good nutritional properties. Furthermore, it is of interest as a functional food with potential beneficial effects on human health. In spite of these nutritional properties it has not received due attention for research like other founder crops (e.g. wheat or barley). There is limited information relating to its review and nutritional components to health benefits. This paper attempts to review the literature regarding the nutritional and therapeutical values of Chanaka and their potential health benefits described in Ayurveda and contemporary research.

1.1. Chanaka - An Ayurvedic Perspective

The word Chanaka in Sanskrit means “Sasyavishesh” i.e. extraordinary in many crops (Raja, 1967). According to Acharya Charaka, it has light, cold, sweet, slightly astringent, roughning, beneficial for pitta and kapha and useful as pulses and paste, while Acharya Susruta says that the same when combined with ghrita is excellent pacifier of Vata (Kashinath and Gorakhnath, 2010). The plant is refrigerant. The exudates from the plant are astringent and useful in bronchitis. Boiled leaves are applied to sprains and dislocated bones. The leaf juice is stomachic and laxative. The seeds are stimulant, tonic, aphrodisiac, antihelminthic and useful in bronchitis and biliousness. They are useful in leprosy and other skin diseases. Seeds are astringent and given in dyspepsia, vomiting, indigestion and constipation, also in diarrhea, dysentery and snakebite. Powdered seeds along with seeds of *Psoralea corylifolia* and neem leaves are reported to cure leucoderma. They are used for headache, sore throat and cough. Boiled gram is used in pulmonary, uterine and anal diseases. Gram mixed with *Dhatura* is used as poultice for edema and toothache (Gupta and Sharma, 2008). The plant is used in dysentery, snake bite, diabetes, renal stone, vomiting, worms, acidity and gastric problems, constipation and dyspepsia. Seeds are used as tonic, in amoebic dysentery to cure cough and coryza and taken internally to control urination. Seed powder is applied as paste to remove lies and dandruff. Leaves are useful in tooth stolling and stomach disorders. Young shoots are used for ailments due to sunstroke (Gupta and Sharma, 2008).

1.2. Botanical Illustration of Chanaka

Synonyms (The Ayurvedic Pharmacopoeia of India, 2008)**:** Harimantha, Sakalapriya, Vajimantha

Regional Language Names (The Ayurvedic Pharmacopoeia of India, 2008)

Ass.: Imas

Ben.: Chholaa

Eng.: Bengal gram, Chick pea, Gram

Guj.: Chanaa, Chanya

Hin.: Buut, Chanaa, Chunnaa, Chane, Chholaa

Kan.: Kadale

Mal.: Katal

Mar.: Harbaraa, Chane

Punj.: Chholaa

Tam.: Katalai, Kadalai, Kondakkadalai

Tel.: Sangalu

Taxonomical Classification (United State Department of Agriculture (USDA))

Kingdom - Plantae - Plants Subkingdom - Tracheobionta - Vascular plants Superdivision - Spermatophyta - Seed plants Division-Magnoliophyta - Flowering plants Class - Magnoliopsida - Dicotyledons Subclass - Rosidae Order - Fabales Family - Fabaceae - Pea family Genus - Cicer Linn. - Cicer Species - Cicer arietinum Linn. - Chick pea

1.3. Pharmacognostical Features (The Ayurvedic Pharmacopoeia of India, 2008)

Macroscopically fruit of Chanaka is turgid, pod with persistent calyx and short stalk; 1.5 to 2.0 cm in length and 5 mm to 1 cm in breadth; apex acute, base tapering, surface light brown, pubescent; seeds 1 to 3, brown, triangular, with pointed apex, micropyle present below the apex; cotyledons 2, yellowish to dark yellow; odour, mild but specific; taste, slightly astringent. Microscopically fruit shows single layered epicarp covered with cuticle, covering and glandular trichomes similar to stem; mesocarp consists of thin walled parenchyma cells, a number of vascular bundles similar to leaf present in a row; lower mesocarpic region shows a band of 3 to 4 layers of lignified sclereids with narrow lumen, followed by a row of thick walled and lignified fibres, inner most region show 2 to 3 layers of parenchyma cell; seed coat shows 2 rows of palisade like macrosclereids, linea lucida present in outer layer; followed by a zone of thin walled parenchymatous cells, outer 2 to 3 layers thin walled and tangentially elongated cells, remaining cells circular to oval, lower parenchyma cells tangentially elongated and collapsed, small vascular bundles and vascular strands present; cotyledon shows thin walled parenchyma cells, most of them loaded with aleurone and starch grains; starch grains simple, mostly oval with cleft shaped central hilum, measuring up to 20 µ in length.

2. Materials and Methods

2.1. Mode of Action of Chanaka as per Ayurveda (Pharmacological Effects)

Due to kashaya rasa (astringent) Chanaka is useful in wound healing property and a very good absorbent especially to dry up impaired doshas in disease state (Kashinath and Gorakhnath, 2010). The laghu guna which gets digested easily make it a good dietary component. The ruksha guna act as a good absorbing agent specially in clearing the obstruction to digestive and metabolic pathway. Further, the sheeta veerya (cold potency) of Chanaka make it nourishing, strength promoting and body growth promoting. It is a relatively inexpensive source of different vitamins, minerals and several bioactive compounds (phytates, phenolic compounds, oligosaccharides, enzyme inhibitors, etc.) that could help in lowering the chronic diseases (Wood and Grusak, 2007; Duke, 1981; Huisman and Van der Poel, 1994). Recent reports of chickpea or Chanaka consumption in relation to health are discuss such as increased consumption of soluble fiber from foods result in reduced serum total cholesterol and LDL-cholesterol and has an inverse correlation with CHD mortality (Kushi et al., 1999; James et al., 2003; Marlett et al., 2002; Anderson and Hanna, 1999; Noakes et al., 1999; Fehily, 1999). LA and Beta-sitosterol are the major PUFA and phytosterol, respectively, in chick pea seeds or Chanaka; therefore chickpea seeds could be incorporated as part of a regular diet that may help to reduce

blood pressure (Ling and Jones, 1995; Clark, 1996; Moreau et al., 2002). Chickpea or Chanaka have a higher amount of resistant starch and amylase which lower the bioavailability of glucose results lowering the GI and insulinaemic postprandial response (Pittaway et al., 2007; Kendall et al., 2004; Osorio-Diaz et al., 2008). Butyrate has been reported to suppress cell proliferation and induce apoptosis which may reduce the risk of colorectal cancer (Cummings et al., 1981; Mathers, 2002). Lycopene, an oxygenated carotenoide present in chickpea seeds or Chanaka may reduce the risk of prostate cancer (Giovannucci et al., 1995). Biochanin A is an isoflavone, inhibits the growth of stomach cancer cells in vitro and reduces tumor growth when the same cells are transferred to mice (Dixon, 2004; Yanagihara et al., 1993). Chick pea or Chanaka being a low-GI food could be an effective choice in weight-loss programmes (Swinburn et al., 2004; Brand-Miller et al., 2002; Hole et al., 1992). This helps in improving fat metabolism and could be helpful in correcting obesity related disorders (Yang et al., 2007). Chickpea or Chanaka supplementation in the diet resulted in increased satiation and fullness (Murty et al., 2010). The above mentioned researches establish the potential if Chanaka in preventing the occurrence of certain chronic and life threatening disease conditions on daily consumption and also in several disease conditions.

Table 1: *Different forms of medicament prepared from Chanaka*

Form	Indication	Reference
Yush (Soup)	Pitta and Kaphaja disease	Charaka Sutrasthana 27/27
Lepa (Mask)	Best to pacify Pitta and Kapha	Charaka Sutrasthana 27/28
Yush (Soup)	Jvara (Fever)	Charaka Chikitsa 3/188
Yush (Soup)	Rakta-Pitta (Bleeding disorder)	Charaka Chikitsa 4/37
Yush (Soup)	Yakshma (Tuberculosis)	Charaka Chikitsa 8/116
Hima (cold infusion)	Chardi (Emesis)	Charaka Chikitsa 20/31
Lehya (semisolid preparation)	Chardi (Emesis)	Charaka Chikitsa 20/37
Yush (Soup)	Visarpa (Erysipelas)	Charaka Chikitsa 21/110
Yush (Soup)	Trishna (Polydipsia)	Charaka Chikitsa 22/31
Yush (Soup)	Vata-shonita (Gout)	Charaka Chikitsa 29/51
Pathya	Pathya	Susruta Sutrasthana 20/5
Ghrita	Tridoshasamaka	Susruta Sutrasthana 46/32
Chanaka prayoga	Prameha (Urinary disorders and Diabetes)	Sushruta Chikitsa 11/6
Yush (Soup)	Jvara (Fever)	Sushruta Uttaratantra 39/150
Yush (Soup)	Kaphaja jvara (Fever with predominance of Vata)	Ashtanga Hridya Chikitsa 1/71
Chanaka	Nasa roga (Nasal disease)	Ashtanga Hridya Uttaratantra 20/3

Table 2: *Therapeutic uses of Chanaka*

Form	Indication	Reference
Chanaka	Aggrevate Vata and cure bleeding diathesis	Dhanvantari Nighantu, Suvarnadi Varga 34/89
Chanaka	Pacifies Kapha and Pitta, cures blood diseases, indigestion emesis and fatigue, aggravates vata and acts as tonic, spermopiotic and appetizer.	Dhanvantari Nighantu, Suvarnadi Varga 34/90
Chanaka	Kaphaja roga (cures kapha roga) alleviates Raktapitta, Medohara (reduced fat)	Sodhal Nighantu, Guna Sangraha, Simbidhanya Varga , 22/939-940
Chanaka	Kaphasrikpittapunsatvghna, vatala, hima	Madhava Dravyaguna, 5

Chanaka	Raktapittakaphapaha, Vistambhi, Vaatala, Kusthanashana	Madanpala Nighantu, Dhanyadi Varga, 40
Chanaka	Mehajitavatapittakrit, Diptavarnakaro, Balya, Ruchya	Raja Nighantu, Shalyadi Varga, 85
Chanaka	Visthambhi, Punsatvakaraka, Pittasrakaphanashana	Kaiyadeva Nigantu, Dhanya Varga, 41/70
Chanaka	Pittaraktakaphapaha, Vatala, Jwaranashana	Bhavaprakash Nighantu, Dhanya Varga, 11/53
Chanaka	Jwarapittaraktakaphapaha, Vatala, Jwaranashana	Gunaratnamala, Dhanya Varga, 9
Chanaka	Kaphapittasrikhrit, Punsatvanashyati	Priya Nighantu, Dhanya Varga, 10/30
Chanaka	Deepana, Varnakara, Balakaraka, Ruchikaraka	Sankara Nighantu, 257

3. Discussion

3.1. Nutritional Facts of Chanaka

Table 3: *Nutrient composition of Chanaka (Cicer arietinum L.) in g 100-g (32) Crop (United States Department of Agriculture, 2010)*

	Carbohydrate	Fat	TDF	Total sugars
Chanaka (*Cicer arietinum* L.)	60.7	6.0	17.4	10.7

Table 4: *Amino* acid content in Chanaka (Cicer arietinum L.)

Amino acid	Rao and Subramanian (1970) (*)	Wang and Daun (2004) (†)	Alajaji and El-Adawy (2006) (†)	Wang et al. (2006) (‡)
Lysine	45-79	5.90 (5.2-6.90)	7.70	5.55
Methionine	7-31	1.50 (1.1-1.70)	1.60	2.05
Cystine	7-18	1.40 (1.1-1.60)	1.30	0.15
Phenylalanine	30-68	5.30 (4.5-5.90)	5.90	5.42
Tyrosine	20-35	2.30 (1.4-3.10)	3.70	2.55
Isoleucine	44-60	3.60 (2.5-4.40)	4.10	3.70
Threonine	28-48	4.30 (3.7-4.70)	3.60	3.23
Valine	38-63	4.00 (2.8-4.70)	3.60	3.60
Arginine	-	9.80 (8.3-13.6)	10.30	8.11
Histidine	-	2.20 (1.7-2.70)	3.40	2.66
Alanine	-	4.1(3.6-4.53)	4.40	3.40
Aspartic acid	-	12.80 (11.1-15.9)	11.40	10.59
Glutamic acid	-	16.00 (13.4-19)	17.30	16.70
Glycine	-	3.90 (3.3-4.20)	4.10	3.12
Proline	-	4.80 (4.0-6.30)	4.60	3.95
Serine	-	6.00 (5.5-6.90)	1.10	4.96

D-Desi; N/D not determined; * - in mg g-1 protein; † - in g 16-g N; **‡ -** in g 100-g; * & **† -** Chanaka type is not specified.

4. Conclusion

The information presented here shows the literary review of Chanaka or chickpea as well as its nutritional importance and its role in improved nutrition and health. Chanaka or chickpea is a protein

rich legume, it is cholesterol free and good sources of protein, dietary fibre vitamins and minerals. Scientific studies provide some evidence to support the potential beneficial effects of chickpea components in lowering the risk for various chronic diseases, although information pertaining to the role of individual chickpea components in disease prevention and the mechanisms of action are limited to date. There is a growing demand for Chanaka due to its nutritional value. This research work paved a path to reveal the nutritional benefits of Chanaka.

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Review Article

Millets: The Indigenous Food Grains

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Abstract The present study aims to explore nutritional as well as the therapeutic potential of millets in perspectives of *Ayurveda* substantiated by modern scientific studies. The methodology adopted for the study includes field survey, review of literature starting from ancient Indian classics of *Ayurveda*, modern scientific and research-based publications including journals and periodicals. Millets are still used as supplementary food grains in tribal and relatively lesser developed parts of the country. Millets have been widely used in therapeutics in *Ayurveda* classics. Nutritional potential of millets may be well understood by the following facts- Pearl millet (*Pennisetum typhoides* Burm.f.Stapf. & Habbard) is significantly rich in resistant starch, soluble and insoluble dietary fibers, minerals and antioxidants. It contains 2.8% crude fiber, 7.8% crude fat, 13.6% crude protein, and 63.2% starch. Foxtail millet (*Setaria italica* Linn. Beauv.) is rich in lysine. Finger millet (*Eleusine coracana* Linn.) has carbohydrate 81.5%, protein 9.8%, crude fiber 4.3% and minerals 2.7% which is higher than wheat and rice. Kodo millet (*Paspalum scrobiculatum* Linn.) and little millet (*Panicum miliare* Lam.) also have 37.38% dietary fiber which is highest among cereals. In Proso millet (*Panicum miliaceum* Linn.) protein content found to be 11.6% of dry matter and is greater than wheat protein. Millets have a high nutritive value comparable to major cereal grains. Thus millet proteins are a good source of essential amino acids, micronutrients, phytochemicals, antioxidants, and minerals. The presence of all required nutrients in millets makes them potential dietary supplements.
Keywords *Antioxidants; Dietary supplement; Essential amino acids; Millets*

1. Introduction

Millets are oldest as well as primitive indigenous food grains to be used as staple food. The word “Millet” derived from the latin word “Milium” means small seed (Robert, 2000). Millets are a specific group of plant of Poaceae family containing smaller seed than major cereals (Macdonell and Keith, 1958). They are unique among food grains having smaller size but higher in nutrition. They were first ever introduced in *Rigveda* then in *Yajurveda* and *Atharvaveda* (Bindu, 2010). In Ayurvedic text millets have been referred by the name as *Kudhanya* (Shastri, 2011) and *Trin Dhanya* (Gupta, 2011). These are *Sama* (Echinochloa frumentace Linn.), *Kodo* (Paspalum scrobiculatum Linn.), *Neewar* (Hygroryza aristata Retz.), *Gavedhuk* (Coix lacryma jobi Linn), *Kanguni* (Setaria italica Linn. Beauv.), *Cheena* (Panicum miliaecum Linn.), *Jowar* (Sorghum vulgare Pers.), *Ragi* (Eleusine coracana Linn.), *Bajra* (Pennisetum typhoides Burm.f.Stapf. & Habbard). Millets have been used as food as well as therapeutic diet in *Ayurveda* since *samhita kala*. The one of the best therapeutic indication of these grains is as *Pathya* in various diseases.

1.1. Objective of the Study

The present study aims to explore the nutritional as well as therapeutic potential of millets and advocate their use as future staple food grains for developing countries.

Table 1: *Therapeutic indication of millets in Ayurvedic*

Millet	Botanical Name	Synonyms	Rasa	Guna	Therapeutic uses
Sama (Barnyard Millet)	*Echinochloa frumentace* Linn.	*Shayamak, Shyam, Tribeej, Rajdhanya, Trinbeej, Uttam* (Shastri, 2011)	M, *S*	*Sheet, Snigdh, Laghu*	*Obesity, Raktapitta, Pittaj kasa, Urustambha, Stanyadosa, Jalodara*
Kodo Millet	*Paspalum scrobiculatum* Linn.	*Kodrav, Kordush, Kudyal, Uddalak, Madanagraj*	M, T	*Guru,Ruksha*	*Obesity, Raktapitta, Pittaj kasa,Visha, Urustambha, Trishna, Jalodara, Kustha Stanyadosa, Jalodara*
Gavedhuk (Job's Tear)	*Coix lacryma* jobi Linn.	*Vaijyanti,*	K, M	*Ruksha*	*Obesity, Kapaj Chardi*
Kanguni (foxtail Millet)	*Setaria italica* Linn. Beauv	*Kanguni, Pitatandula, Vatal, Sukumar, Priyangu*	M, S	*Guru, Ruksha*	*Kustha Vatakarak, Pitta-daha nashak, Bhagna-asthi Sandhan*
Cheena (Common Millet)	*Panicum miliaceum* Linn.	*Varak, Sthulkangu, Sthul priyangu, Kangubhed, Marha*	M, S	*Ruksha*	*Brihana*
Jwar (Great Millet)	*Sorghum vulgare* pers.	*Jurnahwa,Yavnal, Raktika Krostupuccha, Sugandhika,*	M	*Guru, Sheet*	*Brihana Malrodhak, Ruchikarak, Viryavardhak, Raktavikar*
Ragi (Finger Millet)	*Eleusine coracana* Linn.	*Madhuli, Ragika, Nartak, Madua*	M, T, S	*Laghu sheet*	*Brihana Triptikarak, Balakarak, Raktapitta shamak*
Bajra (pearl Millet)	*Pennisetum typhoides* Burm.f.Stapf. & Habbard	*Bajranna, Sajak, Nalika, Neelkaran, Agrayadhanya*	M	*Ruksh, Ushna*	*Balya, Agnideepak, Strikamodpadaka, Punsatvahar, Durjara (nighantu ratnakar)*
Neewar	*Hygroryza aristata* Nees.	*Tini, Aranyadhanya, Munidhanya, Trinodbhav*	M	*Laghu, Snigdh, Sheet*	*Raktapitta,Vatarakta, Pathya, Kaphkarak, Malamutra rodhak*

2. Methodology

The methodology adopted for the study includes field survey, literary survey including Ayurvedic literature and research papers related to the topic.

2.1. Nutritive Value of Millets

Nutritional value is the key feature of dietary quality and potential aspect of food grains, because nutrition is responsible for complete physical well being of the society. The richness in dietary fiber, protein, calcium, iron, potassium, zinc, magnesium, vitamins, makes them unique among the cereals. Millets are gluten free, so least allergenic and most digestible grains.

The table shows all the nutritional aspects of millets with respect to major cereals (Ravindran, 1991).

		
Echinochloa frumentace Linn. *(Sanwa)*	*Paspalum scrobiculatum* Linn. *(Kodo)*	Coix lacryma jobi Linn. *(Gavedhuka)*
		
Setaria italica Linn. *Kanguni*	*Panicum miliaceum* Linn. *Cheena*	*Sorghum vulgare* pers. *Jwara*
		
Eleusine coracana Linn. *Ragi (Madua)*	*Pennisetum typhoides* Burm.f.Stapf. & Habbard *(Neewar)*	*Hygroryza aristata* Nees. *(Bajara)*

3. Results and Discussion

Pearl millets is significantly rich in resistant starch, soluble and insoluble dietary fibers, minerals and antioxidants. It contains about 92.5% dry matter, 2.1% ash, 2.8% crude fiber, 7.8% crude fat, 13.6% crude protein and 63.2% starch.

Foxtail millet is used as a supplementary protein source as it is rich in lysine. Finger millet has a carbohydrate content of 81.5%, protein 9.8%, crude fiber 4.3%, and mineral 2.7% that is comparable to other cereals and millets. Its crude fiber and mineral contents are markedly higher than that of wheat (1.2% fiber, 1.5% minerals) and rice (0.2% fiber, 0.6% minerals).

The protein content is relatively better balanced and contains more lysine, threonine, and valine than other millets. Kodo millet and little millet were also reported to have 37% to 38% of dietary fiber, which is the highest among the cereals and has higher polyunsaturated fatty acids. The protein content of Proso millet (11.6% of dry matter) is significantly rich in essential amino acids (leucine, isoleucine, and methionine) than wheat protein. Pearl millet has highest content of micronutrient as iron, zinc, magnesium, phosphorus and vitamins as folic acid and riboflavin. Finger millet is excellent source of calcium and PUFA (Poly unsaturated fatty acids). Barnyard millet contains highest protein

content next to Foxtail millet. All the essential elements of the diet which are responsible for the development of human being are present in millets.

Table 2: *Nutrient composition of millets compared to major cereals (per 100 g)*

Food grains	Carbohydrate(g)	Protein (g)	Fat (g)	Energy (kcal)	Fiber (g)	Mineral (g)	Ca (mg)	P (mg)	Fe (mg)
Finger millet	72.0	7.3	1.3	328	3.6	2.7	344	283	3.9
Kodo millet	65.9	8.3	1.4	309	9.0	2.6	27	188	0.5
Proso millet	70.4	12.5	1.1	341	2.2	1.9	14	206	0.8
Foxtail millet	60.9	12.3	4.3	331	8.0	3.3	31	290	2.8
Little millet	67.0	7.7	4.7	341	7.6	1.5	17	220	9.3
Barnyrd millet	65.5	6.2	2.2	307	9.8	4.4	20	280	5.0
Sorghm	72.6	10.4	1.9	349	1.6	1.6	25	222	4.1
Bajra	67.5	11.6	5.0	361	1.2	2.3	42	296	8.0
Wheat	71.2	11.8	1.5	346	1.2	1.5	41	306	5.3
Rice	78.2	6.8	0.5	345	0.2	0.6	10	160	0.7

Source: Nutritive value of Indian foods, NIN, 2007

Table 3: *Essential amino acid profile of Millets (mg/g of N)*

Grains	Agn	Htd	Lyn	Typ	PhA	Tyn	Mth	Cyn	Thy	Luc	Ilc	Vln
Foxtail	220	130	140	60	420	-	180	100	190	1040	480	430
Proso	290	110	190	50	310	-	160	-	150	760	410	410
Finger	300	130	220	100	310	220	210	140	240	690	400	480
Little	250	120	110	60	330	-	180	90	190	760	370	350
Barnyard	270	120	150	50	430	-	180	110	200	650	360	410
Sorghum	240	160	150	70	300	180	100	90	210	880	270	340
Bajra	300	140	190	110	290	200	150	110	140	750	260	330
Rice	480	130	230	80	280	290	150	90	230	500	300	380
Wheat	290	130	170	70	280	180	90	140	180	410	220	280

Source: Nutritive value of Indian foods, NIN, 2007

Agn-Argenine, Htd-Histidine, Lyn-Lysine, Typ-Tryptophan, PhA-Phenyl Alanine, Tyn-Tyrosine, Mth-Methionine, Cyn-Cytosine, Thy-Thyrosine, Luc-Lucine, Ilc-Isolucine, Vln-Valine

Table 4: *Fatty acid composition of millets*

Millet	Palmitic	Palmoleic	Stearic	Oleic	Linoleic	Linolenic
Foxtail	6.40	-	6.30	13.0	66.50	-
Proso	-	10.80	-	53.80	34.90	-
Finger	-	-	-	-	-	-
Little	-	-	-	-	-	-
Sorghum	14.0	-	2.10	31.0	49.0	2.70
Bajra	20.85	-	-	25.40	46.0	4.10
Rice	15.0	-	1.90	42.50	39.10	1.10
Wheat	24.50	0.80	1.00	11.50	56.30	3.70

Source: Nutritive value of Indian foods, NIN, 2007

In Ayurvedic texts all the millets are specially indicated as *Pathya* in many diseased conditions since primitive time. *C. lacryma* has been said to be best for losing fat and obesity. *P. scrobiculatum* and *E. frumentace* used for Obesity, *Raktapitta, Pittaja Kasa, Visha, Urustambha, Trishna, Kustha, Stanyadosa, Jalodara*. *E. coracana* used for *Brihana Triptikarak, Balaya, Raktapitta shamak. P. typhoides used for Balya, Agnidepak, Strikamodpadaka*.

Table 5: *Amylose and amylopectin content of millets*

Food grain	Amylose (%)	Amylopectin (%)
Proso millet	28.2	71.8
Foxtail millet	17.5	82.5
Kodo millet	24.0	76.0
Finger millet	16.0	84.0
Sorghum	24.0	76.0
Bajra	21.1	78.9
Rice	12-19	88-81
Wheat	25.0	75.0

Source: MILLET in your Meals, Available from: http://www.sahajasamrudha.org

Table 6: *Micronutrient profile of Millets (mg/100g)*

Millets	Mg	Na	K	Cu	Mn	Mb	Zn	Cr	Su	Cl
Foxtail	81	4.6	250	1.40	0.60	0.070	2.4	0.030	171	37
Proso	153	8.2	113	1.60	0.60	-	1.4	0.020	157	19
Finger	137	11.0	408	0.47	5.49	0.102	2.3	0.028	160	44
Little	133	8.1	129	1.00	0.68	0.016	3.7	0.180	149	13
Barnyard	82	-	-	0.60	0.96	-	3	0.090	-	-
Kodo	147	4.6	144	1.60	1.10	-	0.7	0.020	136	11
Sorghum	171	7.3	131	0.46	0.78	0.039	1.6	0.008	54	44
Bajra	137	10.9	307	1.06	1.15	0.069	3.1	0.023	147	39
Rice	90	-	-	0.14	0.59	0.058	1.4	0.004	-	-
Wheat	138	17.1	284	0.68	2.29	0.051	2.7	0.012	128	47

Source: Nutritive value of Indian foods, NIN, 2007

Table 7: Vitamin profile of Millets (mg/100g)

Millet	Vit.B_1	Vit.B_3	Vit.B_2	Vit.A	Vit.B_6	Folic Acid	Vit.B_5	Vit.E
Foxtail	0.59	3.2	0.11	32	-	15.0	0.82	31.0
Proso	0.41	4.5	0.28	0	-	-	1.2	-
Finger	0.42	1.1	0.19	42	-	18.3	-	22.0
Little	0.3	3.2	0.09	0	-	9.0	-	-
Barnyard	0.33	4.2	0.1	0	-	-	-	-
Kodo	0.15	2.0	0.09	0	-	23.1	-	-
Sorghum	0.38	4.3	0.15	47	0.21	20.0	1.25	12.0
Bajra	0.38	2.8	0.21	132	-	45.5	1.09	19.0
Rice	0.41	4.3	0.04	0	-	8.0	-	-
Wheat	0.41	5.1	0.1	64	0.57	36.6	-	-

Source: Nutritive value of Indian foods, NIN, 2007

4. Conclusion

Ayurvedic literature reflects that millets (minor grains) have been used as a dietary supplement as well as therapeutic agent for long time. Overall nutritional superiority of millets equips them with nutritional and neutraceutical potential. These grains are ignored by society because of inclination towards rice and wheat. Our society is suffering from malnutrition and other dietary insufficiencies. So, we have to change the food habits. It is the only way to conserve the indigenous food grains of India.

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Review Article

Avant Grade Step towards the Management of *Jvar* (Fever) with Special Reference to *Priya Nighantu*

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Abstract Plants are the exclusive source of the drugs for the treatment of the diseases; millions of peoples are dependent upon herbal medicines. *Acharya* Priyavrata Sharma enumerates various drugs acting on *jvar* (fever) in his book *Priya nighantu. Jvar* may be a symptom in some disease, or it may be a disease itself. Almost all the human beings have experienced this disease in one or the other way. Many treatment methods have been mentioned in different *Ayurvedic* texts. The present study targets to screen drugs acting on *jvar* and their clinical importance. 70 drugs out of total 452 drugs approximately are described with *jvarhar* property throughout the text which includes herbal, mineral and animal origin drugs and compound formulations.
Keywords: Fever; Herbal; *Jvar*; *Priya nighantu*.

1. Introduction

Ayurveda embraces the knowledge of different facets of life as described in the following verse – "*Tatrayusceti cetnanuvritih jivitam anubandho dhari cha*" i.e., *Ayu* and term *Veda* denoting knowledge (Sastri, 2011). Thus perfect health in *Ayurveda* is described as to one having *doshas, agni* and functions of *dhatu* and *malas* in a state of equilibrium and has cheerful mind, intellect and sense organs is termed as *Svastha* (health) (Sharma, 2010). In order to achieve such state *Ayurveda* adopted three treatment methods among which *Yuktivyapasraya* deals with the treatment of drug materials. *Dravyaguna vigyana* is the section of *Ayurveda* dealing with the drug sources which is divided into *Nama, Rupa*, and *Gyana* which represents the understanding of *Aushadi* (drug material). *Nighantu* can be considered as one of the important aspect in study of *Ayurveda*. As study of the *Nighantu* has not given much significance but, they are as ancient as *Ayurveda*. It contained synonyms which describes about different aspects of herbs and thus expose their hidden meanings.

The word *Nighantu* is based on term *'Nigama'* as stated, "*Nighantwa kasmata, Nigama ime bhavantii*" which brings out extremely concealed or secret meaning of words (Lucas, 2009). The ancient *nighantus* were like *kosa*, containing the synonyms of *dravya* but later properties, actions and uses of *dravya* were described which became popular. *Priya Nighantu is* written by *Prof.* Priyavrata Sharma

published in 1983. In order to overcome the controversies on opinion about the drugs and their synonyms and action, *Priya Nighantu was* written in simple words to give a clear picture about the *dravya*.

According to recent studies of healthy individuals 18 to 40 years of age, an A.M. temperature of >37.2°C (98.9°F) or a P.M. temperature of >37.7°C (98.9°F) would define a fever. Fever can be caused by abnormalities in the brain itself or by toxic substances that affect the temperature-regulating centres. Some causes of fever are bacterial diseases, endocrine abnormalities, connective tissue disease, neoplasm, brain tumours and environmental conditions etc. (Gyton and Hall, 2010). This paper traverses the *dravya* in *Priya Nighantu especially* with *jvarhar* property. *Jvar* (fever) is known to be chief among diseases. Among the diseases described by *Acharya Charak, Jvar* (fever) is mentioned first because of its being the earliest in appearance of the somatic diseases. Also, *Acharyas* have said at the time of *janma* (birth) and *mrityu* (death) *jvar* is seen (Sastri, 2010). According to *Ayurvedic* mythology *jvar* is originated from *Rudrakopa* (anger of lord shiva) and production of *lobha* and *parigraha* thus afflicting body, senses and mind being oldest among all diseases and severe (Sastri, 2011). *Jvar* effects both *sharira* (body) as well as *manas* (mind) (Sastri, 2011). Effects of fever are *santap* (pyrexia), *aruchi* (anorexia), *trishna* (thirst), *angmarda* (bodyache), and *hridya vyatha* (distress in cardiac region) (Sastri, 2011).

2. Materials and Methods

Screening of each and every *varga* of *Priya Nighantu is* done for plants having a role in treatment of different types of *jvar* as mentioned:

Table 1: *Total Jvarhar drugs in individual varga with respective percentage of Jvarhar action*

No.	Name of *Varga*	Total no. of *Jvarhar*	Drugs	Percentage (%)
1	*Haritakyadivarga*	19	*Amalaki, Agnimantha, Prishnaparni, Brihati, Kantakari, Laghu panchmoola, Dashmoola, Lavanga, Nagakeshar, Karkatashringi, Kataphala, Rudraksha, Saptaparna, Nimba, Parijaata, Kantakikaranja, Narikela, Parushaka, Dadima*	16.52
2	*Pippaliyadivarga*	9	*Ardraka, Patha-Rajapatha, Vidaari-Ksheervidaari, Patola, Devadaali, Draksha, Karavellaka*	23.68
3	*Satpushpadivarga*	22	*Satpushpa, Aranyajeeraka, Dhanyaka, Methika, Usheera, Mushta, Utpala, Mugdaparni, Parnichatushtya, Kalmegha, Sahdevi, Parpata, Vasa, Tulsi, Katuka, Sarpagandha, Rashna, Yavasa-Dhanvayasa, Dronapushpi, Vatsanabha, Datura*	19.29
4	*Sharadivarga*	8	*Vansharochna, Sprikka, Vetasa, Trayamana, Murva, Gojihva, Shaivala, Yuthika*	10.25
5	*Suvarnadivarga*	6	*Abraka, Hingula, Malla, Godanti, Dugdhapasana, Sphatika*	16.66
6	*Shaak varga*	6	*Agastyapushpa, Shobhanjana phala, Karchari, Shalyama, Kevuka, Chatraka*	11.11

Table 2: *Jvarhar drugs in Priyanighantu of herbal origin with respective references*

No.	Drug name	Botanical name	Family	Action of drug	Reference
1	*Amalaki*	*Emblica officinalis Gaertn.*	*Euphorbiaceae*	*Jvarhar*	*P.N. Har.1/8*
2	*Agnimantha*	*Premna mucronata Roxb.*	*Verbenaceae*	*Jvarhar*	P.N. Har.1/29
3	*Prishniparni*	*Uraria picta Desv.*	*Papilionaceae*	*Jvarhar*	P.N. Har.1/35
4	*Brihati*	*Solanum indicum Linn.*	*Solanaceae*	*Jvarhar*	P.N. Har.1/38
5	*Kantakari*	*Solanum surratense Burm. F.*	*Solanaceae*	*Jvarhar*	P.N. Har.1/41
6	*Lavanga*	*Syzygium aromaticum Linn.*	*Myrtaceae*	*Jvarhar*	P.N. Har.1/87
7	*Nagakeshar*	*Mesua ferrea Linn.*	*Guttiferae*	*Jvarhar*	P.N. Har.1/99
8	*Karkatashringi*	*Pistacia integerrima Stewart ex Brandis.*	*Anacardiaceae*	*Jvarhar*	P.N. Har.1/147
9	*Kataphala*	*Myrica esculenta Buch-Ham.*	*Myricaceae*	*Jvarhar*	P.N. Har.1/149
10	*Rudraksha*	*Elaeocarpus ganitrus Roxb.*	*Elaeocarpaceae*	*Jvarhar*	P.N. Har.1/155
11	*Saptaparna*	*Alstonia scholaris R.Br.*	*Apocynaceae*	*Vishamjvarhar*	P.N. Har.1/169
12	*Nimba*	*Azadirachta indica A.Fuss.*	*Meliaceae*	*Kaphapitta jvarhar*	P.N. Har.1/180
13	*Parijaata*	*Nyctanthes arbor-tristis Linn.*	*Oleaceae*	*Jeernajvarhar*	P.N. Har.1/199
14	*Kantakikaranja*	*Caesalpinia crista Linn.*	*Leguminosae*	*Vishamjvarhar*	P.N. Har.1/211
15	*Narikela*	*Cocos nucifera Linn.*	*Palmae*	*Jvarhar*	P.N. Har.1/231
16	*Parushaka*	*Grewia asiatica Linn.*	*Tiliaceae*	*Jvarhar*	P.N. Har.1/235
17	*Dadima*	*Punica granatum Linn.*	*Punicaceae*	*Jvarhar*	P.N. Har.1/236
18	*Aadraka*	*Zingiber officinale Roscoe.*	*Zingiberaceae*	*Jvarhar*	P.N. Pip.2/7
19	*Patha*	*Cissampelos pareira Linn.*	*Menispermaceae*	*Jvarhar*	P.N. Pip.2/21
20	*Rajapatha*	*Stephania hernandifolia (Willd) Walp.*	*Menispermaceae*	*Jvarhar*	P.N. Pip.2/22
21	*Vidaari*	*Pueraria tuberosa DC.*	*Fabaceae*	*Jvarhar*	P.N. Pip.2/45

22	*Ksheervidaari*	*Ipomoea digitata Linn.*	*Convolvulaceae*	*Jvarhar*	P.N. Pip.2/45
23	*Patola*	*Trichosanthes dioica Roxb.*	*Cucurbitaceae*	*Jvarhar*	P.N. Pip.2/54
24	*Devdaali*	*Luffa echinata Roxb.*	*Cucurbitaceae*	*Jvarhar*	P.N. Pip.2/60
25	*Draksha*	*Vitis vinifera Linn.*	*Vitaceae*	*Jvarhar*	P.N. Pip.2/64
26	*Karavellaka*	*Momordica charantia Linn.*	*Cucurbitaceae*	*Jvarhar*	P.N. Pip.2/67
27	*Shatpushpa*	*Anethum sowa Kurz.*	*Umbellifereae*	*Jvarhar*	P.N. Sat.3/2
28	*Aranyajeeraka*	*Centratherum anthelminticum Kuntze.*	*Compositae*	*Jvarhar*	P.N. Sat.3/8
29	*Dhanyaka*	*Coriandrum sativum Linn.*	*Umbellifereae*	*Jvarhar*	P.N. Sat.3/21
30	*Methika*	*Trigonella foenum-graecum Linn.*	*Papilionatae*	*Jvarhar*	P.N. Sat.3/22
31	*Usheer*	*Vetivera zizanioides (Linn.) Nash.*	*Graminae*	*Jvarhar*	P.N. Sat.3/41
32	*Mushta*	*Cyperus rotundus Linn.*	*Cyperaceae*	*Jvarhar*	P.N. Sat.3/43
33	*Utpala*	*Nelumbo nucifera Gaertn.*	*Nymphaeaceae*	*Jvarhar*	P.N. Sat.3/96
34	*Mugdaparni*	*Phaseolus trilobus Ait.*	*Papilionatae*	*Jvarhar*	P.N. Sat.3/101
35	*Kalamegha*	*Andrographis paniculata Nees.*	*Acanthaceae*	*Jvarhar*	P.N. Sat.3/136
36	*Sahdevi*	*Vernonia cinerea Less.*	*Compositae*	*Vishamjvarhar*	P.N. Sat.3/137
37	*Parpata*	*Fumaria vaillantii Loisel.*	*Fumariaceae*	*Jvarhar*	P.N. Sat.3/140
38	*Vasa*	*Adhatoda vasica Nees.*	*Acanthaceae*	*Jvarhar*	P.N. Sat.3/142
39	*Tulsi*	*Ocimum sanctum Linn.*	*Labiatae*	*Jvarhar*	P.N. Sat.3/150
40	*Katuka*	*Picrorhiza kurroa Royle ex Benth*	*Scrophulariaceae*	*Jvarhar*	P.N. Sat.3/158
41	*Sarpagandha*	*Rauwolfia serpentine Benth. Ex Kurz.*	*Apocynaceae*	*Jvarhar*	P.N. Sat.3/164
42	*Rasna*	*Pluchea lanceolata Oliver & Hiern.*	*Compositae*	*Jvarhar*	P.N. Sat.3/165
43	*Yavasa*	*Alhagi camelorum Fisch.*	*Papilionatae*	*Jvarhar*	P.N. Sat.3/182

44	*Dhanvayasa*	*Fagonia cretica Linn.*	*Zygophyllaceae*	*Jvarhar*	P.N. Sat.3/182
45	*Dronapushpi*	*Leucas cephalotes Spreng.*	*Labiatae*	*Vishamjvarhar*	P.N. Sat.3/188
46	*Vatsanabh*	*Aconitum ferox Wall ex Syringe.*	*Ranunculaceae*	*Jvarhar*	P.N. Sat.3/196
47	*Datura*	*Datura metel Linn.*	*Solanaceae*	*Jvarhar*	P.N. Sat.3/201
48	*Vansharochna*	*Bambusa arundinacea Willd.*	*Graminae*	*Jvarhar*	P.N. Shar.4/17
49	*Sprikka*	*Delphinium zalil Aitch & Hemsl.*	*Labiatae*	*Jvarhar*	P.N. Shar.4/19
50	*Vetasa*	*Salix caprea Linn.*	*Salicaceae*	*Jvarhar*	P.N. Shar.4/33
51	*Trayamana*	*Gentiana kurroo Royle.*	*Scrophulariaceae*	*Jvarhar*	P.N. Shar.4/40
52	*Murva*	*Marsdenia tenacissima W.& A.*	*Convolvulaceae*	*Jvarhar*	P.N. Shar.4/41
53	*Gojihva*	*Onosma bracteatum Wall.*	*Boraginaceae*	*Jvarhar*	P.N. Shar.4/54
54	*Shaivala*	*Ceratophyllum demersum Linn.*	*Ceratophyllaceae*	*Jvarhar*	P.N. Shar.4/58
55	*Yuthika*	*Jasminum pubescens Willd.*	*Oleaceae*	*Jvarhar*	P.N. Shar.4/61
56	*Agastyapushpa*	*Sesbania grandiflora*	*Papilionatae*	*Chaturtaka jvarhar*	P.N. Sha.7/21
57	*Shobhanjana phala*	*Moringa oleifera Lam.*	*Moringaceae*	*Jvarhar*	P.N. Sha.7/35
58	*Karchari*	*Cucumis trigonus Roxb.*	*Cucurbitaceae*	*Jvarhar*	P.N. Sha.7/46
59	*Shalyama*	*Brassica rapa Linn.*	*Cruciferae*	*Jvarhar*	P.N. Sha.7/53
60	*Kebuka*	*Costus speciosus (koenig) Sm.*	*Zingiberaceae*	*Jvarhar*	P.N. Sha.7/54
61	*Chatraka*	*Agaricus campestris Linn.*	*Agaricaceae*	*Jvarhar*	P.N. Sha.7/59

Table 3: *Jvarhar drugs in Priya nighantu of mineral origin with respective references*

No.	Drug name	Chemical name	Action of drug	Reference
1	*Abraka (mica)*	Double silicate of aluminium and potassium or sodium	*Jvarhar*	P.N. Suv.6/13
2	*Hingula (cinnabar)*	Red Sulphide of Mercury [HgS]	*Jvarhar*	P.N. Suv.6/24
3	*Malla (gauripasana)*	White arsenic [As2O3]	*Sitajvarhar*	P.N. Suv.6/27
4	*Godanti (gypsum)*	Calcium sulphate [CaSo4.2H2O]	*Jeerna, vishamjvarhar*	P.N. Suv.6/31
5	*Dugdhapasana*	Magnesium silicate [H2Mg3(SiO2)4]	*Pittajvarhar*	P.N. Suv.6/32

	(talc or soft stone)			
6	*Sphatika (alum)*	-	*Vishamjvarhar*	P.N. Suv.6/40

Table 4: *Pharmacological properties of the stated Jvarhar drugs*

No.	Drug name	*Rasa*	*Guna*	*Virya*	*Vipaka*	*Prabhava*	*Doshakarma*
1	*Amalaki*	*Madhura, Amla, Katu, Tikta, Kasaya*	*Ruksha, Guru*	*Shita*	*Madhura*	-	*Pitta shamak*
2	*Agnimantha*	*Tikta, Kasaya*	*Ruksha, Laghu*	*Usna*	*Katu*	-	*Kapha-vata shamak*
3	*Prishniparni*	Madhura, Tikta	*Laghu, Snigdha*	*Ishad Usna*	*Madhura*	-	*Tridosh shamak*
4	*Brihati*	*Katu, Tikta*	*Laghu, Ruksha, Tikshna*	*Usna*	*Katu*	-	*Kapha-vata shamak*
5	*Kantakari*	*Katu, Tikta*	*Laghu, Ruksha, Tikshna*	*Usna*	*Katu*	-	*Kapha-vata shamak*
6	*Lavanga*	*Katu, Tikta*	*Laghu, Snigdha*	*Shita*	*Katu*	-	*Kapha-pitta shamak*
7	*Nagakeshar*	*Kasaya*	*Laghu, Ruksha*	*Usna*	*Katu*	-	*Vatanubandhi pitta shamak*
8	*Karkatashringi*	*Katu, Tikta*	*Laghu, Ruksha*	*Usna*	*Katu*	-	*Kapha-vata nasak*
9	*Kataphala*	*Kasaya, Tikta, Katu*	*Laghu, Tikshna*	*Usna*	*Katu*	-	*Kapha-vata nasak*
10	*Rudraksha*	*Madhura*	*Guru, Snigdha*	*Shita*	*Madhura*	-	*Rakta-vata nasak*
11	*Saptaparna*	*Tikta*	*Laghu, Snigdha*	*Usna*	*Katu*	-	*Kapha-pitta shamak*
12	*Nimba*	*Tikta*	*Laghu*	*Shita*	*Katu*	-	*Kapha-pitta shamak, Raktasodhaka*
13	*Parijaata*	*Tikta*	*Laghu, Ruksha*	*Usna*	*Katu*	-	*Kapha-vatahar, Pittasodhak*
14	*Kantakikaranja*	*Tikta*	*Laghu, Ruksha*	*Usna*	*Katu*	*Visham jvarhar*	*Kapha-vata shamak*
15	*Narikela*	*Madhura*	*Guru, Snigdha*	*Shita*	*Madhura*	-	*Vata-pitta shamak*
16	*Parushaka*	*Madhura, Amla*	*Guru, Snigdha, Picchila*	*Shita*	*Madhura*	-	*Vata-pitta-rakta shamak*
17	*Dadima*	*Madhura, Kasaya*	*Laghu, Snigdha*	*Anushna*	*Madhura*	-	*Tridoshagna*

18	*Ardraka*	*Katu*	*Guru, Ruksha, Tikshna*	*Usna*	*Katu*	-	*Kapha-vata shamak*
19	*Patha*	*Tikta*	*Laghu, Tikshna*	*Usna*	*Katu*	-	*Kapha-vata shamak*
20	*Rajapatha*	*Tikta*	*Laghu, Tikshna*	*Usna*	*Katu*	-	*Kapha-vata shamak*
21	*Vidaari*	*Madhura*	*Guru, Snigdha*	*Shita*	*Madhura*	-	*Vata-pitta shamak*
22	*Ksheervidaari*	*Madhura*	*Guru, Snigdha*	*Shita*	*Madhura*	-	*Vata-pitta shamak*
23	*Patola*	*Tikta*	*Laghu, Ruksha*	*Usna*	*Katu*	-	*Kapha-pitta shamak*
24	*Devdaali*	*Tikta*	*Guru, Snigdha , Tikshna*	*Usna*	*Katu*	-	*Pittahar*
25	*Draksha*	*Madhura*	*Snigdha , Guru, Mridu*	*Shita*	*Madhura*	-	*Vata-pitta shamak*
26	*Karavellaka*	*Tikta*	*Laghu, Ruksha*	*Ishad usna*	*Katu*	-	*Kapha-pitta-raktahar*
27	*Shatpushpa*	*Katu*	*Laghu, Ruksha, Tikshna*	*Usna*	*Katu*	-	*Pittavardhak, kapha-vata shamak*
28	*Aranyajeeraka*	*Tikta*	*Tikshna*	*Usna*	*Katu*	-	*Kapha-vata shamak*
29	*Dhanyaka*	*Kasaya, Tikta, Madhura*	*Laghu, Snigdha*	*Usna*	*Madhura*	-	*Tridosha shamak*
30	*Methika*	*Katu*	*Laghu, Snigdha*	*Usna*	*Katu*	-	*Kapha-vata shamak*
31	*Usheer*	*Tikta*	*Ruksha, Laghu*	*Shita*	*Katu*	-	*Kapha-pitta shamak*
32	*Mushta*	*Tikta, katu*	*Laghu, Ruksha*	*Shita*	*Katu*	-	*Kapha-pitta shamak*
33	*Utpala*	*Madhura*	*Laghu, Snigdha*	*Shita*	*Madhura*	-	*Vata-pitta shamak*
34	*Mugdaparni*	*Madhura*	*Laghu, Ruksha*	*Shita*	*Madhura*	-	*Tridosha shamak*
35	*Kalmegha*	*Tikta*	*Laghu, ruksha*	*Usna*	*Katu*	-	*Kapha-pitta shamak*
36	*Sahdevi*	*Tikta*	*Laghu, Ruksha*	*Usna*	*Katu*	-	*Kapha-vata shamak*
37	*Parpata*	*Tikta*	*Laghu*	*Shita*	*Katu*	-	*Kapha-pitta nasak*
38	*Vasa*	*Tikta*	*Laghu, Ruksha*	*Shita*	*Katu*	-	*Kapha-pitta nasak*
39	*Tulsi*	*Katu,*	*Laghu,*	*Usna*	*Katu*	*Krimighna*	*Kapha-vata*

		Tikta	*Ruksha*				*shamak, Pittavardhak*
40	*Katuka*	*Tikta*	*Ruksha, Laghu*	*Usna*	*Katu*	-	*Kapha-pitta shamak*
41	*Sarpagandha*	*Atitikta*	*Ruksha*	*Usna*	*Katu*	*Nidrajanan*	*Rakta-vatahar*
42	*Rasna*	*Tikta*	*Guru*	*Usna*	*Katu*	*Vishagna*	*Kaphashamak*
43	*Yavasa*	*Tikta, Madhura*	*Laghu, Snigdha*	*Shita*	*Madhura*	-	*Vata-pitta shamak, Kaphanisarak*
44	*Dhanvayasa*	*Tikta, Madhura*	*Laghu, Snigdha*	*Usna*	*Madhura*	-	*Vata-pitta shamak*
45	*Dronapushpi*	*Tikta*	*Guru, Ruksha, Tikshna*	*Usna*	*Katu*	-	*Kapha-vata shamak, Pittasodhak*
46	*Vatsanabh*	*Madhura*	*Ruksha, Tikshna, Laghu, Vyavayi, Vikasi*	*Usna*	*Madhura*	-	*Vata-kapha nasak, Pitta sansodhak*
47	*Datura*	*Tikta*	*Laghu, Ruksha, Vyavayi, Vikasi*	*Usna*	*Katu*	*Madaka*	*Kapha-vata shamak*
48	*Vansharochna*	*Madhura, Kasaya*	*Ruksha, Laghu, Tikshna*	*Shita*	*Madhura*	-	*Vata-pitta shamak*
49	*Sprikka*	*Tikta*	-	*Shita*	-	-	*Kapha-pitta shamak*
50	*Vetasa*	*Kasaya, Katu*	*Laghu*	*Shita*	*Katu*	*Vedanasthapan*	
51	*Trayamana*	*Tikta*	*Ruksha, Laghu*	*Shita*	*Katu*	-	*Kapha-pitta shamak*
52	*Murva*	*Tikta*	*Guru*	*Usna*	*Katu*	-	*Tridoshahar*
53	*Gojihva*	*Madhura, Kinchita tikta*	*Snigdha*	*Shita*	*Madhura*	-	*Vata-pitta shamak, Kaphanisarak*
54	*Shaivala*	*Madhura, Tikta, Kasaya*	*Snigdha*	*Shita*	*Katu*	-	*Pittahar*
55	*Yuthika*	*Madhura*	-	*Shita*	-	-	*Pitta shamak*
56	*Agastyapushpa*	*Kasaya, Tikta*	*Ruksha, Laghu*	*Shita*	*Katu*	-	*Kapha-pitta shamak*
57	*Shobhanjana phala*	*Madhura, Tikta*	*Laghu, Ruksha, Tikshna*	*Usna*	*Katu*	-	*Vata-kapha shamak*
58	*Karchari*	*Tikta, Amla*	*Laghu*	*Usna*	-	-	*Tridosha shamak*
59	*Shalyama*	*Madhura*	*Laghu*	*Usna*	-	-	*Tridosha shamak*

60	*Kebuka*	*Tikta*	*Laghu, Ruksha*	*Shita*	*Katu*	*Garbhasaya sankochaka*	*Kapha-pittahar*
61	*Chatraka*	*Madhura*	*Laghu, Snigdh, Picchila*	*Shita*	*Madhura*	-	*Vata-pitta shamak, Kaphavardhak*

Table 5: *Survey of the Pharmacological action of drugs with respective research work*

No.	Name of the drug	Reported pharmacological activity	References
1.	*Agnimantha Premna mucronata Roxb.*	Anti-pyretic, Anti-noci-ceptive & Anti-inflammatory activity	Narayan, N., Tiruguan, A. and Sambantham, P. 2000. Antipyretic, anti-nociceptive and anti-inflammatory activity of Premna herbaceous roots. *Fititerpia,* 2(2), pp.147-153.
2.	*Prishniparni Uraria picta Desv.*	Anti-inflammatory activity	Hem, K., Singh, N. K. and Singh, M. K. 2017. Anti-inflammatory and hepatoprotective activities of the roots of Uraria picta. *International Journal of Green Pharmacy*, (Suppl) 11(1), S166.
3.	*Brihati Solanum indicum Linn.*	Anti-microbial activity	Srividya, A. R., Arunkumar, A., Cherian, B. and Senthoorpandi, L. V. 2003. Pharmacognostical, phytochemical 7 anti-microbial studies of Solanum indicum leaves. *Ancient science of Life,* 29(1), pp.3-5.
4.	*Lavanga Syzygium aromaticum Linn.*	Natural antihelmintic, Anti-pyretic activity	Amin, M., Jassal, M. M. S. and Tyagi, S. V. 2013. Phytochemical screening and isolation of Eugenol from Syzygium aromaticum by Gas Chromatography. *International Journal of Research in Pharmacology and Phytochemistry,* 3(1), pp.74-77.
5.	*Nagakeshar Mesua ferrea Linn.*	Antipyretic, Analgesic, Immunomodulatory, Antimicrobial activity	Chahar, M. K. 2013. Mesua ferrea L.; A Review of the medical evidence for its Phytochemistry and Pharmacological actions. *African Journal of Pharmacy and Pharmacology,* 7(6), pp.211-219.
6.	*Nagakeshar Mesua ferrea Linn.*	Anti-malarial, anti-bacterial, anti-inflammatory, Analgesic activity	Nadpara, N. P. 2012. Phytochemistry and Pharmacological of Mesua ferrea Linn. - a review. *Research Journal of Pharmacognosy and Phytochemistry,* 4(6), pp.291-296.
7.	*Karkatashringi Pistacia integerrima Stewart ex Brandis.*	Anti-inflammatory activity	Ismail, M. 2011. Pharmacognostic and phytochemical investigation of the stem bark of Pistacia integerrima Stew ex Brandis. *Journal of Medicinal Plants Research,* 5(16), pp.3891-3895.
8.	*Kataphala Myrica esculenta Buch-Ham.*	Anti-inflammatory activity	Patel, T. 2011. Mast cell stabilizing activity of bark of M. nagi. *Int. J. Pharm. Stu. Res.,* 2, pp.1-6.
9.	*Kataphala Myrica esculenta*	Antispasmodic, anti-inflammatory,	Panthari, P. 2012. Mnagi: A Review on active constituent biological and therapeutic effect.

	Buch-Ham.	Analgesic activity	*Int. J. Pharm. Phrmaceut. Sci.,* 4(5), pp.38-42.
10.	*Rudraksha Elaeocarpus ganitrus Roxb.*	Anti-inflammatory activity	Singh, R. K. and Pandey, B. L. 1999. Anti-inflammatory activity of Elaeocarpus sphaericus fruit extracts in rats. *J. Med. Arom. Plant Sci.,* 21, pp.1030-2.
11.	*Rudraksha Elaeocarpus ganitrus Roxb.*	Analgesic activity	Katavicm P. L. 2007. Indolizidine alkaloids with delta opiod receptor binding affinity from leaves of Elaeocarpus fuscoides. *J. Nat. Prod.,* 69, pp.1295-9.
12.	*Saptaparna Alstonia scholaris R.Br.*	Anti-microbial activity	Phukan, S. N. 2014. Phytochemical and pharmacognostical analysis of Alstonia scholaris (l) RBR: A commonly available medicinal plant in Assam, India. *Res. J. Chem. Sci.,* 4(11), pp.68-71.
13.	*Nimba Azadirachta indica A.Fuss.*	Antiviral, anti-inflammatory, antipyretic avtivity	Thani, A. M. and Kumar, D. 2011. Azadirachta indica (Neem) Leaf: A review. *J Pharm Res.,* 4(6), pp.1824.
14.	*Parijaata Nyctanthes arbor-tristis Linn.*	Antipyretic activity	Pujare, V. S. 2013. Pharmacognostical studies of Nyctanthes arbo-tristis L. stem bark – a common but less known folkfore herb. *Indian Journal of Traditional Knowledge,* 12(2), pp.284-287.
15.	*Parijaata Nyctanthes arbor-tristis Linn.*	Analgesic and Anti-Inflammatory Activity	Kakoti, B. B., Pradhan, P. and Kumar, M. 2013. Analgesic and anti-inflammatory activities of the methanolic stem bark extract of Nyctanthes arbor-tristis Linn. *BioMed Res Int.,* pp.1-6.
16.	*Kantakikaranja Caesalpinia crista Linn.*	Immunomodulatory activity	Shukla, S., Mehta, A. and Shukla, S. 2009. Immunomodulatory activities of the ethanolic extract of Caesalpinia bonducella seeds. *J Ethnopharmacol,* 125, pp.252-6.
17.	*Kantakikaranja Caesalpinia crista Linn.*	Analgesic, Antipyretic, Anti-Inflammatory activity	Shukla, S. 2010. Studies on antiinflammatory, antipyretic and analgesic properties of Caesalpinia Bonducella F. seed oil in experimental animal models. *Food and Chemical Toxicology,* 48(1), pp.61-64.
18.	*Kantakikaranja Caesalpinia crista Linn.*	Antimalarial activity	Kalauni, S. K. and Tezuka, Y. 2006. Antimalarial activity of cassane and norcassane type diterpenes from Caesalpinia Crista and their structure activity relationship. *Biological and Pharmaceutical Bulletin,* 29(5), pp.1050-1052.
19.	*Narikela Cocos nucifera Linn.*	Antifungal, antibacterial, antiprotozoal, antiviral activity	Fife, B. 2000. The Healing Miracles of Coconut Oil. *Piccadilly Books Ltd., Health wise Publications,* Colorado Springs, Co., pp.1-46.
20.	*Parushaka Grewia asiatica Linn.*	Analgesic and antipyretic activity	Das, D., Mitra, A. and Hazra, J. 2012. Evaluation of antipyretic and analgesic activity of Parusaka (Grewia asiatica Linn.): an indigenous Indian Plant. *IJRAP,* 3(4), pp.519-

			523.
21.	*Parushaka* *Grewia asiatica Linn.*	Antifungal and Antiviral activity	Kumari, S. and Mazumder, A. 2009. Studies of the antifungal and antiviral activity of methanolic extract of leaves of Grewia asiatica. *Pharmacognosy Journal,* 1(3).
22.	*Parushaka* *Grewia asiatica Linn.*	Anti-malarial and Antiemetic activity	Haq, M. Z. and Ahmad, S. 2012. Antimalarial, antiemetic and antidiabetic potential of Grewia asiatica L. leaves. *Journal of Medicinal Plants Research,* 6(16), pp.3087-3092.
23.	*Parushaka* *Grewia asiatica Linn.*	Immunomodulatory activity	Singh, S. and Yadav, A. K. 2014. Evaluation of immunomodulatory activity of Grewia asiatica in laboratory animals. *Journal of Chemical and Pharmaceutical Research,* 6(7), pp.2820-2826.
24.	*Dadima* *Punica granatum Linn.*	Antibacterial activity	Nair, R. and Chanda, S. V. 2005. Antibacterial activity of Punica granatum exhibited in different solvents. *Ind J Pharm Sci,* 67, pp.239-43.
25.	*Aadraka* *Zingiber officinale Roscoe.*	Anti-inflammatory activity	Mashhadi, N. S., Ghiasvand, S. and Askari, G. 2013. Anti-oxidative and anti-inflammatory effects of ginger in health and physical activity: review of current evidence. *Int J Prev Med,* 4(Suppl 1), pp.S36-S42.
26.	*Patha* *Cissampelos pareira Linn.*	Antipyretic activity	Hullatti, K. K. and Sharada, M. S. 2007. Research article comparative antipyretic activity of Patha: an ayurvedic drug. *Phcog Mag,* 3(11), pp.173-176.
27.	*Ksheervidaari* *Ipomoea digitata Linn.*	Anti-inflammatory, immunomodulatory activity	Manuele, M. G., Ferraro, G. and Anesini, C. 2006. Comparative immunomodulatory effect of Scopoletin on tumoral and normal lymphocytes. *Life Science,* 79, pp.2043-2048 .
28.	*Patola* *Trichosanthes dioica Roxb.*	Anti-bacterial activity	Harit, M. and Rathee, P. S. 1995. The antibacterial activity of the unsaponifiable fraction of the fixed oils of *Trichosanthes dioica* Seeds. *Asian J Chem,* 7:909-11.
29.	*Patola* *Trichosanthes dioica Roxb.*	Anti-inflammatory and anti-pyretic activity	Badrul Alam, M., Sarowar Hossain, M. and Sultana Chowdhury, N. 2011. Antioxidant, anti-inflammatory and anti-pyretic activities of *Trichosanthes dioica* Roxb. fruits. *Journal of Pharmacology and Toxicology,* 6, pp.440-453.
30.	*Devdaali* *Luffa echinata Roxb.*	Anti-inflammatory, Analgesic activity	Sharma, T., Arora, R. and Gill, N. S. 2012. Evaluation of free Radical scavenging, Anti-inflammatory and Analgesic potentials of *Luffa Echinata* seed extract. *J Med Sci,* 12, pp.99-106.
31.	*Draksha* *Vitis vinifera Linn.*	anti-inflammatory, analgesic and antipyretic activity	Aouey, B. and Samet, A. M. 2016. Anti-oxidant, anti-inflammatory, analgesic and antipyretic activities of grapevine leaf extract (Vitis vinifera) in mice and identification of its active constituents by LC-MS/MS analyses.

			Biomed Pharmacother, 84, pp.1088-1098.
32.	*Karavellaka Momordica charantia Linn.*	anti-inflammatory, analgesic activity	Sathish Kumar, D. 2010. A medicinal potency of momordica charantia. *International Journal of Pharmaceutical Sciences and Research,* 1(2), pp.95-100.
33.	*Shatpushpa Anethum sowa Kurz.*	anti-inflammatory activity	Valadi, A., Nasri, S. and Amir, G. R. 2010. Antinociceptive and anti-inflammatory effects of hydroalcoholic extract from the seed of Anethum graveolens L. *Journal of Medicinal Plants,* 9(34), pp.124-130.
34.	*Dhanyaka Coriandrum sativum Linn.*	Antipyretic , antihelmintic activity	Pandey, S. 2010. Coriandrum sativum: A biological description and its uses in the treatment of various diseases. *IJPLS,* 1(3), pp.119-126.
35.	*Methika Trigonella foenum-graecum Linn.*	Immunomodulatory activity	Bin-Hafeez, B., Haque, R. and Parvez, S. 2003. Immunomodulatory effects of fenugreek (Trigonella foenum graecum L.) extract in mice. *Int. Immunopharmacol,* 3, pp.257-265.
36.	*Usheer Vetivera zizanioides (Linn.) Nash.*	anti-inflammatory activity	Jagtap, A. G. and Phadke, A. S. 2004. Effect of polyherbal formulation on experimental models of inflammatory bowel diseases. *J. Ethnopharmacol,* 90, pp.195-204.
37.	*Mushta Cyperus rotundus Linn.*	Antipyretic activity	Singh, N. 1970. A pharmacological study on Cyperus rotundus. *Indian J. Med. Res.,* 58, pp.103-109.
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3. Discussion

Fever has been conceded as one of the hallmarks of clinical disease since ancient times. It is a physiological disorder in which the temperature is elevated above one's normal temperature. Many proteins, breakdown products of proteins, and certain other substances, especially lipopolysaccharide toxins released from bacterial cell membranes, causes the set-point of the hypothalamic thermostat to

rise. Substances that cause this effect are called Pyrogens. Pyrogens released from degenerating body tissues cause fever during disease conditions (Gyton and Hall, 2010).

According to *Acharya Charak*, *Jvar* (fever) arises from eight causative factors - such as *vata, pitta, kapha, vata-pitta, vata-kapha, pitta-kapha, vata-pitta-kapha* and the eighth as *Agantuka* (exogenous) (Sharma, 2011). In general premonitory symptoms of fever includes fatigue, restlessness, abnormal complexion, abnormal taste, lachrymation, liking for and again aversion to cold, air, sun-heat etc., yawning, body-ache, heaviness, horripilation, anorexia, feeling of darkness, lack of cheerfulness and feeling of cold, specifically, excessive yawning, burning in eyes and dislike for food are observed in cases of *vata, pitta* and *kapha* respectively. All the symptoms are present together in fever caused by aggravation of all *doshas*. In that caused by combination of two *doshas*, symptoms of the concerned *doshas* are found (Sharma, 2010). The *Agantuka jvar* (exogenous) is the eighth type of *jvar* (fever) initiated with pain and caused by *Abhighat* (injury), *Abhishang* (evil organisms), *Abhichar* (spell), and *Abhishap* (curse). It remains as such for a while and later on gets associated with *doshas* (Sastri, 2011).

The pathophysiological basis of *Jvar* (fever) can be studied under following pathogenesis (*Samprapti chakra)*, along with description of the type of drug to be used on the basis of mode of action on evaluating Table 3 (Sharma, 2011).

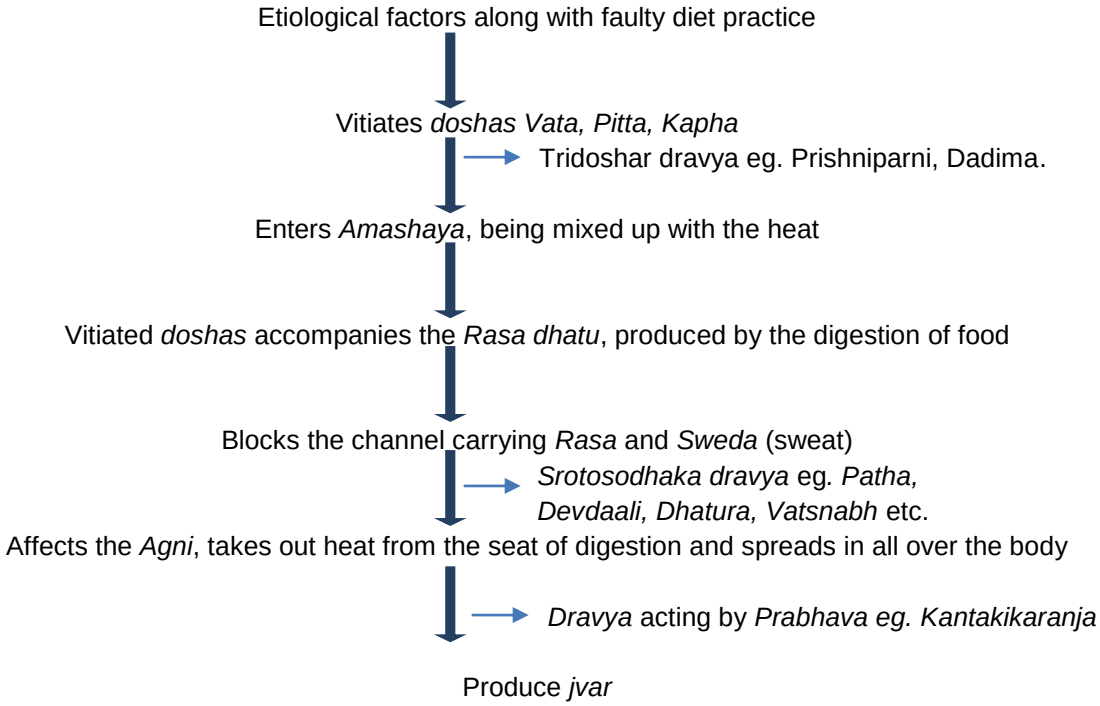

Figure 1: *Pathogenesis of jvar* (*Samprapti chakra)*

Priya nighantu describes about 13 *varga* in total comprising of herbal, mineral, and animal origin drugs. Drugs of *Priya nighantu* are screened for their *jvarhar* action. Total 70 drugs including 3 compound preparations are found to be with *jvarhar* action. Obtained data is registered as per *jvarhar* action which belongs to different *varga* with corresponding references. Also the percentage tabulated represents the fraction of drugs with *jvarhar* action among the total drugs stated under the individual *vargas* (Table 1). Out of 70 drugs 19 drugs (16.52%) belong to *Haritakyadi varga* which include 2 compound formulation, 9 (23.68%) drugs from *Pippaliyadi varga*, 22 (19.29%) belong to *Satpushpadi varga* including 1 compound preparation, *Sharadi varga* has 8 (10.25%), *Suvarnadi varga* 6 (16.66%),

and *Shaak varga* 6 (11.11%). Table 2 also disclose that the drugs included in *Dashmoola* specially *Agnimantha, Prishniparni, Brihati,* and *Kantakari* are described with *jvarhar* action, also *Parnichatushtya* is mentioned with *jvarhar* property. These drugs are also further elaborated with their *jvarhar* action after *Priya nighantu* by other *Ayurvedic Samhitas*. Others drugs like *Lavanga, Nagakeshar, Nimba, Dadima, Patola, Dhanyaka, Kalamegha, Sarpagandha, Rasna* etc. also helps in relieving from *jvar. Usheer, Mushta, Parpata* which is included in *Sadangapaniya* also exhibits *jvarhar* action which is also described by *Acharya Charak* in the Chikitsa of jvar.

Charak also discusses about *Vishamjvar*, also a type of fever which is characterised by "*vishama arambha"* (fever starting from different parts of body), "*vishama kriya*" (irregular nature) and "*vishama kala*" (irregular periodicity) (Madhavakara, 1955). It is classified into five types - *Santaka, Satataka, Anyedyushka, Tritayaka* and *Chaturtaka jvar* according to their involvement in *dhatus* and occurrence of fever (Sastri, 2011). Some drugs are specifically described with *Vishamjvarhar* action like *Sahdevi, Dronapushpi, Saptaparna,* and *Kantakikaranja* along with *Godanti* and *Sphatika* (mineral origin). Person suffering from *jvar* with *kapha* and *pitta* dominancy can be treated with *Nimba*, also *Agastyapushpa* can be prescribed in *Chaturtaka jvar*. Mineral origin drugs characterised under the *Suvarnadi varga* portrays *jvarhar* activity of *Abraka, Hingula, Malla,* and *Dugdhapasana* particularly effecting *sitajvar, pittajvar, vishamjvar* and *jeerna* types of jvar.

Table 3 emphasizes on the pharmacological properties of these *jvarhar* drugs mentioned in *Priya nighantu* helpful in understanding their mode of action.

4. Conclusion

It is a venture on the part of this review paper to culminate the documented herbs in the *Priya nighantu* having *Jvarhar* property. In this study 70 drugs with *Jvarhar* action are assembled in order as mentioned in the *Nighantu* which includes 61 herbal drugs, 3 compound preparations namely *Laghu Panchamoola*, *Dashmoola* and *Parnichatusya* and 6 mineral origin drugs. Also on evaluating the reported pharmacological actions of these drugs (Table 4), various research articles are studied which provides a clear evidence of their *jvarhar* potential. Plants have been a good source of medicine in treating various types of diseases but characterization of many plants and their active compounds has not been done yet. This study will be helpful for further studies on the clinical use of these plants and thus will be beneficial for promoting research and development in the field of medicine and opens new perspective for research and treatment of *Jvar*.

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Review Article

Paediatric Management in Siddha System of Medicine

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Abstract Siddha system of medicine is the most popular traditional system of medicine followed by the people of Tamilnadu nowadays. Gradually, the system is spreading its benefits to the people of surrounding states also. With strong basic principles and cultural background, Siddha system of medicine is providing health care solutions to a number of health issues of the modern era. Though it is a system of medicine, Siddha system is guiding us to lead a perfect living in this world, starting from the first day of birth to the last day of death. Not only that, the system takes care even before the conception itself. Today's children are the future citizens of a nation. To have a better nation, healthy citizens can contribute a lot. The health status of the children, their growth and development at different stages of life, the expected health issues during their childhood and its management, prevention of those obstacles, the way of living are all clearly described in Siddha system in a scientific approach. Specific Siddha drug formulations exclusive for Paediatric usage are given by Siddhars to combat common childhood diseases and disorders. These information are dealt with in this presentation.

Keywords *Children's health; Paediatric Siddha drug formulations; Siddha; Stages of child life*

1. Introduction

Siddha system of medicine is the most popular traditional system of medicine followed by the people of Tamilnadu nowadays. Gradually, the system is spreading its benefits to the people of surrounding states also. With strong basic principles and cultural background, Siddha system of medicine is providing health care solutions to a number of health issues of the modern era. Though it is a system of medicine, Siddha system is guiding us to lead a perfect living in this world, starting from the first day of birth to the last day of death. Not only that, the system takes care even before the conception itself. Siddha System of Medicine is founded by 18 Siddhars who had achieved Eight Siddhis. Siddha is the word derived from the root word "Siddhi" which means "Perfection" or "Eternal Bliss". Siddhars are those who have attained this by practicing "Attangayogam" or Eight types of Yoga. They wanted to overcome the mysteries of life like narai, thirai, moopu, pini, sakkadu (Greying of hair, loss of elasticity of skin, ageing, diseases, and death) in order to attain "Veedu Peru" or "GOD". Siddha system of Medicine is a by-product of this noble deed.

2. Siddha – Fundamentals

Siddha System of Medicine describes the Healthy way of living in this world. The system is based on five elements, three vital forces, six tastes. They are called as Aymperum boothangal, Muththathukkal and Aru suvaikal. Mann, Neer, Thee, Kaatru and Akayam are the five elements [4]. These five elements combined in different permutation and combination to form the Three vital forces (Vali, Azhal and Iyam) and Six tastes (Sweet, Sour, Astringent, Pungent, Bitter and Salt). These five are responsible for the formation of 96 Thathuvankal which are the basic phenomenon and principle of Siddha system of Medicine. The concept of "Unavae Marunthu; Marunthae Unavu" [14] is the famous paradigm followed in the system. Siddha System of Medicine has classified the medicines in to two types [13].

1) Internal Medicines – 32 types.
2) External therapies and procedures – 32 types.

Apart from these two certain special treatment procedures are also followed. They are

1) Varmam Therapy
2) Kayakarpam – Rejuvenation therapy
3) Yogam and Pranayamam [18]

The main aim of Siddhars is "Prevention is better than cure". The preventive principles are explained elaboratively in the text "Theraiyar Pini anugavithi ozhukkam" which describes the daily and seasonal regimens to be followed by the people to prevent diseases [20]. Also the sage Thiruvalluvar, has briefly explained the principles of prevention of diseases in his "Thirukkural" in 10 couplets in the chapter "Marunthu".

3. Paediatrics in Siddha System

Today's children are the future citizens of a nation [2]; [9]. To have a better nation, healthy citizens can contribute a lot. The health status of the children, their growth and development at different stages of life, the expected health issues during their childhood and its management, prevention of those obstacles, the way of living are all clearly described in Siddha system in a scientific approach [6]. Specific Siddha drug formulations exclusive for Paediatric usage are given by Siddhars to combat common childhood diseases and disorders. The Text book dealing with Paediatrics in Siddha system is called as "Balavagadam". "Balavagadam" is the branch of medicine dealing with the diseases of the children and their management & treatment through Siddha System of Medicine or Care of infants and children through Siddha way [1].

3.1. Antenatal Care

Care of infants and children starts from time of puberty of a girl itself. Siddha Medicine aims at healthy germs (Quality unicellular Sperm and Ovum) which yields healthy generation or off springs. The food and health wise practices of different community people of Tamilnadu during menarche and puberty are aimed at quality ovum. Hence the Maternal and Child care Management goes simultaneously hand in hand with each other. In order to get quality embryo, Siddha System has explained specified month wise regimen of formulations with Siddha herbal drugs [12]. Also, specified month wise therapeutic formulations for combating probable pathological signs and symptoms constitute the ante natal care of the gestational women. During the gestational period, Siddha system insists to take Bavana Panchankula thylam at $5^{th}/7^{th}$ month of gestation to have healthy development of foetus and

normal delivery of the baby. The rituals performed during the period of pregnancy are to ascertain optimal growth and development of all the organs of the growing foetus. Eg. Valaikappu function. It is also targeted to execute socio cultural bond of the family with the society [10]. Not only that, the imbalance of the Psycho social environment of the pregnant women is kept at bay and makes them to feel secure and happy to have a normal delivery of the baby.

3.2. Postnatal Care

Normal Puerperium of the delivered mother is ensured by gradual introduction of normal food and beverages to the mother as described in Siddha literatures. Apart from that, introduction of certain Siddha medicines like Sowbakkiya Sundi Legyam, Athirsta Rasayanam are specifically indicated for normal puerperium and for sufficient secretion of breast milk to meet out the healthy needs of the child which can improve the immunity of the infants. House hold preparations containing Vendhayam (Fenugreek seeds), Ulunthu (Black gram), Chukku (Dried Ginger), Gingelly oil are periodically administered as food supplements which are also helpful for both mother and baby [8].

3.3. Importance of Rituals – Health aspects

The Post Natal Care [7] includes ceremonies that are celebrated in order to develop natural immunity, social maturity, emotional bonding and social security. They are

1) Birth (Information and registering in community)

2) Introduction of Seinei/Urai marunthu by maternal uncle (To prevent common disorders like respiratory, Gastro intestinal disorders etc.,)

3) Naming (Authenticating gene carriers with surname)

4) Ear Boring (First Injury to develop Immunity)

5) Annapraasannam - First solid feeding – Rice Introduction

6) Induction of Knowledge (To develop cognitive parameters)

3.4. Paruvangal

In Siddha system of medicine, the Growth & Development and diseases of the children [16]; [17] are explained in consonance with different stages (Paruvangal). The scientific approach in those days with respect to Paruvangal is so common that these stages are mentioned in linguistic literatures like Meenakshi Pillai Tamil etc. [15]. The terminologies coined for each stages are so scientific that each one these are correlated exactly with the developmental milestones of the growing infants and children. Also the probable health issues that a child can encounter at each stage are also described. The different stages for male children up to the age of five are 1. Kappu, 2. Senkeerai, 3. Thaalaattu, 4. Sappani, 5. Muththam, 6. Varugai, 7. Ambuli, 8. Sirtril, 9. Siruparai, 10. Siruthaer. For female children, the first seven stages as explained for male children are common and the last three stages are 8. Kalangu, 9. Oonjal and 10. Ammanai.

3.5. Diseases of the Children

Paediatric illnesses or the diseases of the children are classified into

1) Agakaarana noigal
   due to intra uterine factors (develops congenitally)

2) Purakaarana noigal
   due to external factors (acquired) [1], [6].

Agakaarana Noigal

1) Erythema toxicum neonatorum & Asphyxia livida (Senkiranthi & Karunkiranthi)
2) Infectious diseases [10] (Thodam)
3) Gastro intestinal disturbances [17] (Maantham)
4) Respiratory diseases [16] (Kanam)
5) Eczema & skin diseases (Karappan)
6) Diseases of oral cavity (Akkaram)

Purakaarana Noigal

1) Non-stop crying immediately after birth
2) Borborygamus
3) Fullness of abdomen
4) Regurgitation of milk
5) Reluctance to suck milk
6) Coeliac diseases [3]
7) Constipation [3]
8) Anuria [3]
9) Infections[3]
10) Hiccups [3]

Though the Siddha Paediatric literatures classified the diseases of the children as mentioned above, clinically some important diseases are also being registered in a Siddha hospital. The diseases that affect the children are Respiratory disorders, Gastro intestinal disorders, Skin disorders, Neurological

disorders, Cerebral palsy, Autism, Muscular Dystrophy, Nutritional disorders, and Metabolic disorders other common childhood disorders [3].

3.6. Treatment

Siddhars have enumerated various effective internal and external remedies for the above said conditions. In these remedies, herbal drugs play a major role and most of the formulations are using plant raw drugs. The formulations contain very less ingredients of Mineral drugs. Most of these medicines are administered in breast milk up to one year of age as it contains necessary immunity factors for the child. The formulations are mostly in the form of decoction and tablets as these forms are easily absorbed in the circulation. Lipid based medicines (Ghee) are nutritive and also cross blood brain barrier to reduce the neurological symptoms.

Common Paediatric prescriptions

1) Urai Mathirai: A Siddha formulation which is very effective immune-booster for children. This can be prescribed from 3rd month of age to 5 years which can prevent common respiratory and gastro intestinal disorders [11].

2) Sei Nei consisting of juice of 54 herbs mixed with castor oil administered in drops even from first day of birth. This is still in practice in certain Southern districts of Tamilnadu like Madurai, Theni districts etc., This is referred to as senai vaithal.

3) Bala Sanjeevi and Balakudori mathirai - A Herbomineral formulation very effective in URTI/LRTI.

4) Bhavana kadukkai [11], [19] – A good herbal haematinic formulation.

5) Vasambu karukku – The activated charcoal in this formulation controls diarrhoea and dysentery.

6) Vallarai mathirai – a common herbal tablet which calms ADHD and sharpens memory.

7) Oma theneer – a distillation process which increases appetite & promotes digestion.

8) Sombu theneer – a distillation process which helps in digestion and regurgitation.

9) Asta chooranam – an effective herbal formulation which is very useful in digestive disorders.

10) Vallarai nei – a medicated ghee preparation used for Kanam and neurological problems.

11) Brahmi Nei [5] – a good herbal ghee preparation for all neuro muscular disorders.

12) Chundai vatral Chooranam – a powder Siddha formulation which is a good antehelminthic.
13) Aya Birungaraja Karpam – Haematinic preparation in Siddha [21].

Puramaruthuvam procedures

1) Thokkanam – for all types of neuro muscular disorders.

2) Podi Thimirthal – effective in spastic paralysis of the limbs.

3) Puravalaiyam- for all joint disorders.

4) Varmam – for all neuromuscular disorders, autism, mental retardation.

5) External application of oils, ointments, paste etc.,

6) Foementation, inhalation therapy, fumigation etc.,

7) Yogam – for autism, MR, learning disabilities, ADHD and sharpens memory.

8) Pranayamam – for respiratory disorders, ADHD etc.

Food for Children

1) Exclusive Breast Milk feeding till 6 months of age.

2) Cow's milk, buffalo's milk, goat's milk – after months.

3) Annaprasanam – After 6 months- weaning of solid foods – Able to appreciate tastes.

4) Introduction of fruits, vegetables, greens etc.,

5) Fruit juices

6) Gram boiled water

7) Greens boiled water [11]

8) Coriander leaves boiled water – may be used even before 6 months.(aids in digestion, controls regurgitation, helps in defaecation)

9) Carom seeds boiled water – similar to Coriander leaves

10) Dried grapes soaked water [8]

11) Ghee is important as it favours digestion.(Good preservative).

12) Most of the Siddha Paediatric drug formulations are in the form of kudineer and nei. Quick digestion, easy assimilation and can cross BBB. e.g Vallarai nei, Sei nei, Adathodai Kudineer etc.

Siddha System of medicine is caring for the total well-being of the children as it also gives importance to socio cultural development by recommending certain games for children which is very helpful in developing the physical, mental and socio cultural well-being. Thus the system paves the way for total and complete health well-being.

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Review Article

A Literary View of Vaman and Virechan Karma in the Management of Sthula Pramehi w.s.r. Type 2 Diabetes Mellitus

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Abstract Diabetes mellitus is a chronic metabolic disorder in which the body is unable to make proper use of glucose due to reduced secretion of insulin by the pancrease resulting in hyperglycemia (high blood sugar) and glycosuria (sugar in urine) we take is generally broken down into simple sugar called glucose in over body. Glucose circulates in the blood and enters the cell with the help of insulin. Due to sedentary lifestyle and predisposition the beta cell are unable to make insulin, which is the key for glucose to enter into the cells. Panchkarma is the popular term for shodhan chikitsa. Among that Virechan is an important one. Virechan is the therapy the doshas are made to pass through the adhomarg.
Keywords: *Diabetes mellitus; Panchkarma; Vaman; Virechan*

1. Introduction

Perhaps never before health and wealth have gone in such a contradictory manner when wealth is booming like nothing and health is booming like everything.

Madhumeha has been classified under the vatika type of prameha. The vata may be provoked either directly by the etiological factors of Avarana by kapha and pitta to its path or by continuous depletion of dhatus. The factors which provoke the vata directly cause Apatarpanjanya Madhumeha (Type 1) while the factors which provoke kapha and pitta cause Santarpanjanya Madhumeha (Type 2).

"*Asyasukham svapnasukham dadhini gramyaudkanuprsa payansi*
Navannpanam gudvaikratam cha prameha hetuh kaphakraccha sarvam" [5]

As per WHO “Diabetes Mellitus is heterogeneous metabolic disorder characterized by common features of chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism due to absolute or relative deficiency in insulin secretion and action or both.

The characteristic features of DM have close resemblance with disease named as Prameha in Ayurveda.

Madhumeha is a vatika subtype of Prameha that is most close to DM.

One variety of this Madhumeha is Aavaranjanya (Due to occlusion) in which aggravation of Vayu is due to its occlusion.

Basic Pathological factor for this Aavaran is Bahudrav Kapha (Bahudrava sleshma dosh vishesh) [2] along with Bahuabadhameda (excess and loosely bound fat) [3].

One of the causative factors for this avarana is asamshodhan (not getting bio cleansing therapy at proper time). This type of madhumeha (DM) can be treated if samshoadhan is used in early stages of disease followed by palliative treatment.

Vaman and Virechan are the samshodhan karma that is compatible to overcome this avarana.

In the reference of Acharya Charak describing chikitsa sutra-prameha chikitsa sutra:

"Sthula pramehi balvanihaika krushsthaik paridurbalashacha
Sambranganam tatra krushasya kayam samshodhanm doshbaladhikyta" [6]

Patients suffering from Prameha can be classified into two categories:

1. Sthula Pramehi - These who are obese and having good strength. They are given shodhan (cleansing purification treatment).
2. Krush Pramehi - These that is emaciated and weak. They are given nourishing treatment - Bramhan therapy (Bramhan therapy is aimed to improve nutrition level of the body.

This treatment aims to improve nourishment and to improve dhatuposhana) both the above cases, patient are administrative snehan (oleation) treatment. Then, vaman, virechan recipes, described in kalpa sthan are administered. After doshas is eliminated, the patient is given Santarpan or nourishing therapy because Aptarpan (fasting) therapy in this condition may produce Gulma (cystic tumor), Kshaya (chronic respiratory disorder), meha (chronic urinary tract disorder), Bastishula (bladder pain), and Mutra Graham (urinary retention). Hence, based on the state of Agni (digestion strength) prameha should be give santarpan (nourishing therapy) after shodhan.

2. Need of Study

Hence, the aim/need of study is as follows:

1. To Maintaining Swasthya of the Swasthya Vyakti and curing the vikar of atura.
2. To discuss and understanding the effect of Vaman and Virechan in T2DM, literary view.

Classical Symptoms of Samshodhanarth Diabetic Patients

- Prabhutamutrata [9]
- Aavilmutrata [9]
- Kshudhakya
- Pindikoudwestanam

- Nishamutrata (Nocturia) [11]
- Karpadtaldaha, Atisweda [4]
- Galatalushosh [4]

Selection of Patient in Vaman and Virechan

- Patient having classical signs and symptoms of disease according to Ayurveda as well as modern science.
- Patients of Prameha having body mass index 25-30 kg/m sq.
- Patients of Non-Insulin Dependent Diabetes Mellitus (NIDDM) with blood sugar level FBS - 126-220 mg/dl or PPBS-180-300 mg/dl.
- Patients in the age group of 20-60 years.
- Patients otherwise healthy and fit for Vaman and Virechan karma as per Ayurvedic classics.

Exclusion Criteria

- Age <20 Years and >60 Years.
- Patients having BMI <25 and >35 Kg/m sq. and disease chronicity for >10 years.
- Patients of Type-1 diabetes or the patients of Type-2 diabetes taking insulin.
- Patients having complication like nephropathy, retinopathy, diabetic foot, carbuncles etc.
- Patients having diabetes in association with Pheochromocytoma, Acromegaly, Cushing's syndrome, Hyperthyroidism, Cardiovascular disease, Renal disease, Carcinoma or any other disease effecting multiple body systems and pregnant woman.

Treatment Schedule

- Deepan-Pachan (Digestive appetizer meditation)
- Aabhyantara Snehapan (Internal oleation)
- Sarvaanga Abhayanga-Swedana (Whole body massage and formulation)
- Vaman-Virechan (Bio-cleansing therapy)
- Samsarjankarma/Santarpan

Drug Selection

Deepan-Pachan Trikatuchurna = 3-6gm/day in two divided doses to be used for 3-5 days for the purpose of Deepen Pachan.

Abhyantara Snehapan

Started with Triphaladi grita [7] in increasing dose as per the Kushta (bowel) and Agni of the subject for the period of 3-7 days.

Abhayang/Swedan

Tilataila is best for whole body Abhayang [1] and Swedan in steam chamber.

Vaman

- Ikshwakubeejachurna [8] mixed with honey in a dose of 4-8gm as per requirement of patients (after 5th day of snehapan).

- Shilajeet Decoction of Shalsaradigana along with is taken according to Agnibala of patients [10].

Virechan

Snuhibhavita Kutki in a dose of 6-10 gm as per the Kostha (Bowel).

Effects of Emesis on Biochemical Parameters [13]

- Vaman is a very stressful work which is done in very early morning.
- Plasma cortisol level is increased after Vaman karma as the highest level of cortisol occurs in early hours of morning and in stress, strain with anxiety condition.
- The cortisol causes hyperglycemia by promoting gluconeogenesis and causes increased protein catabolism with rise of plasma amino acids. This raised blood glucose plasma amino acids stimulate insulin secretion by substrate regulation which is secondary effect.
- The emetic drugs used in Vaman on reaching stomach, stimulate the gastric mucosa along with stimulation of vagus nerve and sympathetic nerve fibres.
- As both Vagus and sympathetic nerve fibres supply the islets cells, stimulation of both fibres by Vaman karma cause stimulation and Beta receptors followed by insulin secretion by neural control.

Effect of Purgation on Biochemical Parameters [13]

- The virechandravyas has the properties like ushma, teekshna, sookshna, and vyavayi gunas. The drugs having these properties will reach the heart by its potency and thereby to the entire dhamanis. Also it reaches to big, small and minute strotas of the body.
- Due to presence of ushnaveerya vishyandana is produced teekshnaguna produces chedan of doshas samoohas and brings in to the koshta.
- From there due to prithvi and jalamahabhoota gunas and also due to adhobhagaharaprabhava the doshas are get eliminated through gudamarg.
- Both Virechan and Vaman aushadha having the same properties but Virechan drugs produce Virechan and Vaman drugs produce Vaman only and it is only because of its prabhava.
- Virechandravyas produce uttejana in the srotas dhamnies, koshta and ultimately on hridaya Kendra.
- Sushruta added saraguna along with the ushnadigunas and this saraguna is helpful in anulomana procedure.

Acharya Charak says the drugs acts not only to its prabhava but also due to its dravatwa prabhava gunatwaprabhava and both dravatwa and gunatwaprabhava are the factor mentioned here may change based on conditions. The effect produced due to above is called Karma. The factor responsible for manifestation of effect is veerya.

3. Conclusion

From this study, we concluded that,

- NIDDM is one of the burning problems which make patients disable due to complication when left unnoticed. So a well designed management protocol is the need of the hour. Biopurification is the choice of treatment in case of Madhumeha (NIDDM) due to bahudosha (excess of hormones).

- Vamana works well on kapha dominant Lakshan like Prabhuta Mutrata, and Avilmutrata, while Virechan subside pitta dominant lakshan like Karpada Tala Daha and Atisweda.
- Symptoms like Kara Pad Suptata, Kshudadhikya, Trishnaadhikya Gala Tala Shosga and pindikodvestana are significantly controlled by Vaman and Virechan.
- Through both the procedure relieve the symptoms, it is Vaman that Provides more relief than Virechan.
- Vaman reduces the level of FBS, PPBS in comparison to Virechan.

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Research Article

Scope of Homoeopathy in the Treatment of the Cases of Cystic Acne using Complete Repertory - A Prospective Study

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Abstract Acne is a disorder of pilosebaceous complex. Nearly 85% of people between the ages of 12-24 years develop this complaint. Use of homoeopathic medication in cases of Cystic Acne following homoeopathic principles and selection of medication based on analysis from general repertory like Complete Repertory enhances the efficacy of homoeopathic medicines as well as provides healing with no bad effects of medication itself.
Keywords *Cystic acne; Complete Repertory by Dr Roger Von Zandvoort; Status Quo; t tabulated; t calculated; Treatment*

1. Introduction

Acne is a disorder of pilosebaceous complex which predominantly affects the peripubertal age group and clinically manifests as comedones (open/closed), papules, pustules, nodules, and cysts and heals with scars known as cystic when there is perifollicular inflammation and size of lesion becomes >5mm.

The principal events involve increase sebum production, abnormal follicular keratization and proliferation of bacteria Propionibacterium acne leading to inflammation of sebaceous gland. People of all races and ages suffer from acne but most commonly it is seen in adolescent young adults. Nearly 85% of people between the ages of 12-24 years develop this complaint.

This study is intended for betterment of the patient who is affected from Cystic acne and to determine the effect of Homoeopathic Medicines by using Complete Repertory. Homoeopathy is based on holistic approach which treats not only the disease, but patient as a whole which tends to cure.

1.1. Aims and Objectives

The study was aimed to achieve following objectives:

- To ascertain utility of 'The Complete Repertory' by Dr. Roger Van Zandvoort in cases of Cystic Acne
- To evaluate the miasmatic influence in the cases of Cystic Acne

- To assess the efficacy of Homoeopathic medicines in treatment of cases of Cystic Acne

2. Materials and Methods

The study was conducted at OPD/IPD of Dr. Madan Pratap Khunteta Homoeopathic Medical College, Hospital and Research Centre, Station Road, Jaipur, INDIA. 50 cases of all age group were selected for the study by random sampling method irrespective of their sex, caste, religion and duration of illness. Study was conducted for a period of 6 months w.e.f. March 25th, 2014. The follow-up of the cases were done at an interval of 7-15 days, as per gravity of the case for the duration of 1to 6 months of per the remedy response.

Detailed case taking and clinical examination was carried out to clinch the diagnosis. Laboratory and other relevant investigations related to the case whenever necessary were done. Effectiveness of the Homoeopathic treatment was assessed according to statistical principles on the basis of change in the score taken before and after treatment with Homoeopathic medicines as well as subjective feeling of improvement and betterment in laboratory parameters were taken into consideration.

Discussions and summary based on the study is as follows:

- Maximum incidence of cystic acne was observed in the age group 20-30 yrs.
- Incidence of cystic acne was more in male than female.
- Cases of cystic acne were more observed in middle income group.
- Maximum numbers of cases were reported from urban areas.
- Cases of cystic acne were observed to be most common in students.
- The most common symptoms were mild itching, pain, pustular and cystic eruption and greasy or oily skin was there in all the cases of cystic acne.
- Maximum number of patients had constipation in their past history.
- Maximum numbers of cases were having respiratory complaints in their family history/blood relations.
- The First Aim was fulfilled, as The Complete Repertory by Dr. Roger Van Zandvoort has proved to be a useful tool in the selection of similimum in working out the cases of Cystic Acne. From the study, 94% positive results were obtained. This Repertory is most up-to-date repertory as it is upgraded by time and user friendly as well.
- The Second Aim was to evaluate the Miasmatic influence in the cases of Cystic Acne. In this study, Cystic Acne was observed to be a mixed miasmatic condition with Psora being the predominating miasm. This verifies the old saying “Psora is the mother of all chronic diseases”.
- The Third Aim was fulfilled, as the efficacy of homoeopathic medicines was established by 94% positive results obtained in this study (18% Cases Cured + 76% improved without any bad effects of medication). This established the usefulness and effectiveness of homoeopathic system of medicine in cases of Cystic Acne fully proved on the basis of factual data observed from the study.

3. Results

In this study, 9 cases (18%) in this study showed cured while 38 cases (76%) were observed improved, 3 cases (6%) showed no improvement and 3 cases (6%) were dropped out.

In the study, *Nat. mur.* Was prescribed in maximum cases i.e. 20 cases (40%) followed by Bryonia in 7 cases (14%), Nat. carb. in 5 cases (10%), Calc. sulp. and Lyco. in 4 cases (8%) each, Nat. phos.

and Puls. In 2 cases (4%) each, Antim crud, Calc. carb., Merc. sol., Nat. sulp., Phos. & Sulphur were prescribed in minimum cases i.e. in 1 case (2%) each (Table 1: Master Chart).

Table 1: *Master chart*

S. No.	Age/ Sex	Residing area	Socio-economic status	Family history	Past history	Miasms	Prescription & potency	Observation after first prescription	Results
1.	22/M	Urban	Middle	F - Arthritis MGF - Cancer	N. S.	Psora	Nat. Mur. 30	Cystic lesion better	Improved
2.	38/M	Urban	Middle	F - Neurological Disorder M - Arthritis	Sinusitis	Psora	Calc. Carb 30	S.Q	Dropped out
3.	21/M	Urban	Middle	F - Migraine	Constipation	Psora	Bryonia 30	Size of cystic lesion reduced	Improved
4.	18/m	Urban	Upper Middle	M - HT, MGM - T.B.	Jaundice	Psora	Nat. Mur. 30	Oiliness of face controlled & cystic lesion better	Improved
5.	18/F	Rural	Middle	N. S.	Jaundice	Psora-syphilis	Silicea 30	S.Q.	Dropped out
6.	20/M	Urban	Middle	N. S.	N.S.	Psora	Bryonia 30	Oiliness of face controlled	Improved
7.	17/M	Urban	Lower middle	G.M. - Joint Pain G. F. - Asthma	Constipation	Psora	Bryonia 30	Number of cystic lesions are reduced	Improved
8.	25/F	Urban	Middle	F. - Joint Pain G.F. - Joint Pain	Jaundice	Psora	Nat. Carb. 30, 200,1M	Constipation better	Improved
9.	19/F	Urban	Upper Middle	N.S.	N.S.	Psora	Nat. Sulph. 30.	Oiliness of face controlled	Cured
10.	29/F	Urban	Middle	G.F - Hemiplasia, Asthma, Sis. - DM	Constipation	Psora-Sycotic	Nat. Phos. 30, 200,1M	Cystic lesion better	Improved
11.	21/F	Urban	Middle	P.G.F. - Heart Attack M.G.F. - cataract	Jaundice	Psoro-Sycotic	Nat.Mur. 30	Constipation better	Improved
12.	18/M	Urban	Middle	M. - H.T	Jaundice	Psora	Lyco. 30	S.Q.	Improved
13.	17/M	Urban	Middle	F - Asthma M.G.F. - Asthma	Br. Asthma	Psora	Kali Brom. 30, 200, 1M	S.Q	Improved
14.	23/F	Urban	Upper Middle	MGF - Heart attack	N.S.	Psora	Bryonia 30	Hom. Agg., new lesions appeared	Cured
15.	19/M	Urban	Middle	P.G.F. - Heart Attack M.G.F. - Thyroid,	Constipation	Psora	Nat.Mur 30	Cystic lesion better	Cured
16.	25/F	Urban	Middle	PGF - Cancer F - Gastric Ulcer	Vitiligo	Psora	Nat. Carb. 30	S.Q.	Improved
17.	32/F	Urban	Middle	F - Hernia M - Migraine	Constipation	Psora	Sulphur 30	S.Q.	S.Q
18.	27/M	Urban	Middle	F - Heart Attack PGM - Heart Attack	Sinusitis	Psora	Nat. Mur.	S.Q.	Dropped out
19.	20/M	Rural	Middle	MGM. - Gout F - Acne	Jaundice	Psora	Calc. Sulph. 30	Hom. Agg., new lesions appeared	Cured
20.	25/F	Urban	Upper Middle	F - All. rhinitis M - Nepholithiasis	Warts, Asthma	Psora	Lyco. 30-200	Constipation & cystic lesion	Improved
21.	30/F	Urban	Lower	F - Heart Attack PGM/F -	Tuberculosis	Psoro-sycotic -	Nat. Mur. 30	Cystic lesion better	Improved

				Asthma		syphilitic			
22.	20/M	Urban	Lower Middle	F - Heart Attack MGM - Asthma	N. S.	Psora	Nat. Mur. 30	S.Q.	Dropped out
23.	18/M	Urban	Middle	F - DM PGM/F - DM M - Thyroid	Jaundice	Psoro-sycotic - syphilitic	Calc. Sulph. 30	Cystic lesion better	Cured
24.	21/F	Urban	Lower Middle	MGF - Asthma	Constipation	Psora	Nat. Carb. 30	Cystic lesion better	Improved
25.	18/M	Urban	lower middle	F - Backache M - Gout	Sinusitis	Psora	Nat. Mur. 30	Oiliness of face controlled	Cured
26.	26/M	Rural	Middle	PGM - Arthritis M - Urolithiasis	Malaria	Psora	Nat. Mur. 30	S.Q.	Dropped out
27	20/M	Rural	Lower	F - Asthma	N.S	Psora	Bryonia Alb. 30	Oiliness of face controlled	Improved
28.	22/M	Urban	Lower middle	N.S.	Constipation	Psora	Nat. Mur. 30-200	Oiliness of face controlled	Improved
29.	18/M	Rural	Middle	PGM - DM M - All. Rhinitis	N.S	Psora	Lyco. 30, 200, 1M	Hom. Agg., new lesions appeared	Cured
30.	21/M	Urban	Middle	N.S.	Jaundice	Psora	Nat. Mur. 30	Cystic lesion better	Improved
31.	21/M	Urban	Middle	N.S	N. S.	Psora	Nat. Mur. 30	Oiliness of face controlled	Improved
32.	19/M	Urban	Upper Middle	F - Alcoholic PGF - Diabetic	Chronic cough	Psora-sycotic	Nat. Mur. 30-200	Cystic lesion better	Improved
33.	20/F	Urban	Middle	N. S.	N. S.	Psoro-sycotic	Pulsatilla 30	Constipation better	Improved
34.	24/M	Urban	Middle	PGF - DM MGM - Cancer	Constipation	Psora	Calc. Sulph. 30	Cystic lesion better	Improved
35.	19/M	Rural	Lower Middle	F - Migraine	Constipation	Psora	Merc. Sol. 30	Cystic lesion better	Improved
36.	18/m	Urban	Upper Class	F - D.M., PGF - DM, HT	Typhoid	Psora	Nat. Mur. 30	Oiliness of face controlled & cystic lesion better	Improved
37.	15/M	Urban	Middle	PGM - DM, HT PGF - Cancer	Constipation	Psora-syco-syphilitic	Nat. Mur 30-200	S.Q.	Improved
38.	22/M	Urban	Middle	N.S.	Jaundice	Psora	Nat. Mur. 30	Oiliness of controlled	Improved
39.	17/M	Urban	Lower Middle	PGM - DM MGM - Cancer	Constipation	Psora	Bryonia Alb. 30	Constipation better	Improved
40.	19/M	Rural	Middle	MGF - Asthma	N.S	Psora	Nat. Mur. 30	Cystic lesion better	Improved
41.	22/M	Rural	Middle	MGM- DM	Sinusitis	Psoro-sycotic	Nat. Phos. 30-200	Cystic lesion better	Improved
42.	22/M	Urban	Lower	M - Cancer	Constipation	Psoro-sycotic	Bryonia alb. 30	S.Q.	S.Q
43.	22/M	Urban	Lower Middle	N.S.	Stammering	Psoro-sycotic	Phos. 30	Cystic lesion >	Improved
44.	18/M	Rural	Middle	F - HT, Bro.- Acne M - Migraine	Br. Asthma	Psora	Nat.Mur. 30	Hom.Agg, new lesions appeared	Cured
45.	20/M	Rural	Lower Middle	M - HT	Constipation	Psora	Nat. Carb. 30	Constipation better	Improved
46.	23/F	Urban	Lower	M/MGF - Hemiplegia	N.S	Psora	Nat. Mur. 30-200	Oiliness of face controlled	Improved
47.	22/M	Urban	Lower Middle	MG - Heart Attack M/PGF - Cancer	Jaundice	Psora-sycotic	Calc. Sulph. 30	Cystic lesion better	Improved
48.	30/F	Urban	Lower Middle	MGF, MGM - DM	Jaundice	Psora	Nat. Mur. 30	Oiliness of face controlled	Improved
49.	24/M	Urban	Lower Middle	F - HT, M - Thyroid, Hypotension, PGF -	N.S	Psora	Nat. Mur. 30, 200,1M	Cystic lesion better	cured

				Hemiplasia					
50.	22/F	Rural	Middle	M - Arthritis	Hair fall	Psora	Lyco. 30-200	Oiliness of face controlled	Improved
51.	19/M	Urban	Lower Middle	PGM/MGF - HT, PGF - Asthma	Constipation	Psora	Nat. Mur. 30-200	S.Q.	S.Q.
52.	18/M	Urban	Lower	F - HT M - Constipation	Typhoid Fever	Psora	Kali. brom 30	S.Q.	Dropped out
53.	19/M	Urban	Middle	F - Arthritis PGF - Heart Attack	Constipation	Psora	Ant. Crude. 30	Constipation & cystic lesion >	Improved
54.	20/F	Urban	Middle	M, PGM, Bro. - DM MGF - Asthma	N.S	Psoro-sycotic	Pulsatilla 30	Hom. Agg, new lesions appeared	Improved
55.	19/F	Urban	Middle	PGF - Cancer M - Typhoid Fever	Constipation	Psora	Nat. Carb. 30	Cystic lesion better	Improved
56.	20/ F	Urban	Middle	F - Hemorrhoid MGM - Heart Complaints	Urticaria	Psora	Nat. Mur. 30-200	Oiliness of face controlled	Improved

Six cases of dropped out cases were not included in the study

Abbreviation: DM – Diabetes Mellitus, HT – Hypertension, HA – Heart Attack, Hypothy. – Hypothyroidism, PGM/F – Paternal Grandmother /Father, Hyper thy – Hyperthyroidism, TB – Tuberculosis, CA – Cancer, MGM/F – Maternal Grandmother/Father, F- Father, M- Mother, GM/F – Grandmother/Father

3.1. Calculation

a. Standard error of the mean differences:

$$\overline{X} = s\frac{\sum X}{n} = \frac{278}{50} = 5.56$$

b. The estimation of the population standard deviation:

$$S_Z = \sqrt{\frac{\sum(X - \overline{X})^2}{n-1}} = \sqrt{\frac{248.3227}{49}} = 2.2511$$

c. Critical ratio or t calculated:

$$t = \frac{\bar{X}}{S_Z/\sqrt{n}} = \frac{5.56}{2.2511/\sqrt{50}} = 17.4677$$

4. Conclusion

The t_{calc} for this study is 17.4677 and t_{tab} is 1.6766 hence $t_{calc} > t_{tab}$, the null hypothesis is rejected at 5% level of significance. Thus alternative hypothesis is accepted. Therefore, it can be clearly conclude with the help of t-test that there is significant improvement in patient's condition after treatment.

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Research Article

Administration of Madhutailika Vasti in Aturahasta Pramana

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Abstract The Dose of a medicine plays an important role in the efficacy of a drug or procedure. It is one among the factors which produces optimum effect of *Niruha vasti*. The dose of *Niruha Vasti* can be measured with *Aturahasta* (patient's own hands). *Madhutailika Vasti* is a commonly practiced *Niruha Vasti* in *Kateegraha*, the effect of which in *Aturahasta Pramana* is so far not studied. Objective of this paper is to study safety and efficacy of *Madhutailika Vasti* administered with *Aturahasta Pramana* in *Kateegraha*. 20 participants satisfying eligibility criteria were selected, *Yogavasti* done under which *Madhutailika Vasti* was administered in *Aturahasta Pramana* up to *Samyak Niruha Lakshana*. 90% of participants required more than one *Putaka* on the first *Niruha* day to obtain *Samyak Niruha Lakshana*, which decreased in subsequent days. There was significant reduction in Visual Analogue Scale ($P<0.001$) and Oswestry disability Index showed statistically significant improvement ($P<0.001$). No significant change was noticed in blood parameters except ESR, which showed a significant reduction ($P<0.05$). The study concluded that *Madhutailika Vasti* administered in *Aturahasta Pramana* is effective in producing *Samyak Niruha Lakshana* in *Kateegraha* and is safe and effective in *Kateegraha*.
Keywords *Aturahasta Pramana; Kateegraha; Madhutailika Vasti*

1. Introduction

Among *Panchakarma* procedures *Vasti* is considered as the supreme therapeutic modality as it radically weed out the morbid *Vata* which is responsible for the pathogenesis of various diseases and movement of all *Dosha, Dhatu* and *Mala* within the body. In *Vasti,* even though *Niruha* and *Anuvasana* are considered as a single unit, *Niruha* plays a major role when compared to *Anuvasana* due to its multi-drug combinations and hence it's utility in varied clinical conditions. It is explained that *Niruha vasti* should not be restricted to one *Vasti* in a single sitting, three or four *Niruha* can be done till the attainment of *Samyak Niruha Lakshana (SNL)* (Sreekumar, 2008). Studies also showed that more than one administration of *Vasti* in a single sitting has more impact on attainment of *SNL* (Mousumi, 2012). Even though it has been proved, it didn't come to practice as multiple administration of *Vasti* on the same day with the conventional dose give rise to complications frequently. It is explained that the *Prasrutha* measurement for *Vasti* should be calculated with *Aturahasta pramana* (AP) patient's own hands (Trikamji Acharya and Ram Acharya, 1997). The amount of *Vasti* taken with *AP* is comparatively lesser hence it is more patient friendly.

Kateegraha indicates a diseased condition of the low back associated with pain and stiffness (Sankara Misra, 2010). Even though it is not mentioned as a separate disease in *Bruhatrayee*, related features are found in *Pakvasayagata Vatakopa Lakshana* (Harisastri Paradakara Vaidya, 2011). As it is related to an aggravation of *Vata* especially in its primary site, *Vasti* has got more significance in the management.

Here, an attempt has been made to conduct a study on the safety and efficacy of *Madhutailika vasti* administered with *AP* in *Kateegraha*.

2. Materials and Methods

2.1. Calculation of *Prasruta* by *Aturahasta Pramana*

100 participants ranging from 20-60 years were selected. Each one directed to keep the palm of one hand stretched out and hollowed as it to hold liquid. The mixture of *Madhutailika vasti* poured into it and measurement of handful of mixture was taken. The procedure repeated for three times for each participants and average of three consecutive measurements were consider as participant's *AP*. Measurements of 100 participants were taken and average calculated as 26 ml. Thus, dose of *Prasruta* by *AP* has been fixed as 26 ml.

2.2. Subjects

20 patients with *Kateegraha* participated in an open clinical trial approved by the Institutional Ethics Committee of Vaidyaratnam P. S. Varier Ayurveda College Kottakkal (IEC/CL/16/13 dated 22-04-2013). Informed consent was obtained from each patient prior to the inclusion in the study. Patients were free to withdraw their name from the study at any time without giving any reason.

The diagnostic criteria consisted of pain in low back region (*Kati Desha*) with a positive Genslen's test or Gillies test or Pump handle test or Schober's test (Das, 2004). The patients attending the IPD of VPSV Ayurveda College Kottakkal aged 20-60 years of either gender or who are fit for Niruha were included in the study. Exclusion criteria denied the participation of subjects with Lumbar spondylolisthesis, Lumbar vertebral fracture, Malignancies, Tubercular spine, Cauda equina syndrome and other major systemic diseases.

Procedure

Vasti procedure was done as per Standard Operative procedure (SOP) (Manojkumar, 2012). On the day of *Niruha* after first *Putaka,* if no *Samyak Lakshana* observed, another administration was done, up to maximum four administrations. *SNL* was assessed with validated proforma (Mousumi, 2012).

2.3. Criteria for Assessment

Safety

- Event evaluation Scale - All the *Vasti ayoga*, *Atiyoga* and *Vyapada lakshana* mentioned in the texts was compiled to form an Event Evaluation Scale.
- Blood - Hb%, Total Count (TC), Differential Count (DC), Erythrocyte Sedimentation Rate (ESR), Fasting Blood Sugar (FBS)

Efficacy

- Visual analogue scale (VAS) for pain (Price et al., 1983)
- Tenderness (Glynn and Drake, 2012)
- Oswestry Disability Index (ODI) for back pain (Fairbank and Pynsent, 2000)

Table 1: *Details of intervention*

S. No	Procedure		Drug	Dose	Duration
1	Purva Karma	Abhyanga	Tila taila	Q.S.	15 mts
		Ushma Sweda			Till samyak swinnalakshana
2	Pradhana Karma	Anuvasana	Sahacharadi taila	100 ml	1st,3rd,5th,7th, 8th day
		Niruha	Makshika (Honey) Lavana(Rock salt) Tila taila(Sesame oil) Satapuspa kalka (Anethum sowa) Erandamula kwatha (Ricinus communis)	60 ml 12 gm 60 ml 24 gm 120 ml	2nd,4th, 6th day

Event evaluation scale was assessed on the day of N*iruha* i.e. on 2nd, 4th, 6th day. Blood parameters, VAS, Tenderness and ODI were assessed before treatment and after treatment i.e. on 0 and 9th day.

Data Analysis

The subjective parameters and laboratory parameters were tabulated and subjected to statistical analysis manually with the help of Microsoft Office Excel 2007. For analyzing effect of therapy, t-Test: paired two samples for means was used.

3. Observations and Statistical Analysis

Descriptive statistics for 20 subjects appear in Table 2. Given the shortness of the study period and the simplicity of the treatment, there was no drop out and no data were missing.

Table 2: *Demographic/clinical characteristics of research participants*

Variable	Number (N=20)	Percentage (%)
Age		
20-30	3	15
31-40	9	45
41-50	6	30
51-60	2	10
Sex		
Male	9	45
Female	11	55
Religion		
Hindu	9	45
Muslim	11	55
Marital status		
Unmarried	5	25

Married	15	75
Occupation		
Desk job	2	10
Manual	2	10
Home maker	9	45
Professional	0	0
Others	7	35
Mode of onset of pain		
Acute	8	40
Gradual	12	60
Severity of pain		
Severe	4	20
Moderate	15	75
Mild	1	05
Chronicity		
< 1 year	6	30
1-2 years	4	20
2-3	4	20
3-4	1	5
4-5	1	5
>5 years	4	20
Apanakopalakshana		
Present	14	70
Absent	6	30
Bhu desha		
Jangala Sadharana	14	70
Anupa Sadharana	6	30
Prakruti		
Vatakapha	10	50
Vatapitha	6	30
Pithakapha	4	20
Kosta		
Mrudu	4	20
Madhyama	9	45
Krura	7	35
Satva bala		
Heena	4	18
Madhyama	10	50
Pravara	6	32

3.1. Assessment of Safety

Event Evaluation Scale

The most observed symptoms in event evaluation scale during *Yogavasti* were *Kukshiruja* (abdominal pain) and *Adhmaana* (abdominal distention). On the first day of *Niruha, Kukshiruja* was noticed in 5% of participants after 1st *Putaka*, 11.11% after 2nd Putaka, 15.38% after 3rd *Putaka* and 16.66% after 4th *Putaka*. *Adhmaana* was observed in 50% of participants after 4th *Putaka*. Klama was noticed in 7.69% participants after 3rd *Putaka* and in 16.66% participants after 4th *Putaka*. *Kukshiashudhi* was observed in 16.66% participants after 4th *Putaka* on first day of *Niruha.*

On second day of *Niruha* after the 2nd *Putaka* in 11.76% participant and in 12.5% after 3rd *Putaka, Kukshiruja* was observed. *Adhmaana* was observed after 4th *Putaka* in 100% of participant as 4th *Putaka* was administered only in one participant.

On third day of *Niruha* after the 1st *Putaka* in 8.33% of participants, *Kukshiruja* was observed (Table 3).

Table 3: *Observation on Vasti ayoga, Atiyoga and Vyapata Lakshana among 20 participants*

Yogavasti	P	N	Kukshiruja		Adhmana		Klama		Kukshiashudhi	
			No	%	No	%	No	%	No	%
1st Nirooha	1st	20	1	5	-	-	-	-	-	-
	2nd	18	2	11.11	-	-	-	-	-	-
	3rd	13	2	15.38	-	-	1	7.69	-	-
	4th	6	1	16.66	3	50	1	16.66	1	16.66
2nd Nirooha	1st	20	-	-	-	-	-	-	-	-
	2nd	17	2	11.76	-	-	-	-	-	-
	3rd	8	1	12.5	-	-	-	-	-	-
	4th	1	-	-	1	100	-	-	-	-
3rd Nirooha	1st	20	-	-	-	-	-	-	-	-
	2nd	12	1	8.33	-	-	-	-	-	-
	3rd	2	-	-	-	-	-	-	-	-
	4th	0	-	-	-	-	-	-	-	-

3.2. Blood Parameters

No significant change was observed in blood parameters except ESR. The mean value of ESR before the treatment was 28.7 which decreased to 22.8 after treatment which was statistically significant at the level of $p<0.05$.

Effect of *Madhutailika Vasti* (Table 4)

Table 4: *Effect of Madhutailika vasti on VAS, Tenderness, ODI*

Parameters	BT	AT	MD	%	S.D	t-value	P value
VAS	6.25	3.25	3	48	0.6488	12.06	<0.001
Tenderness	1.35	0.55	0.8	59.25	0.4103	5.05	<0.001
ODI	40.32	27.17	13.144	32.61	3.509	6.03	<0.001

Effect on VAS

The mean VAS score before the treatment was 6.25 which reduced to 3.25 after the treatment, this decrease of 3 + 0.6488 after treatment was statistically significant at the level of 0.1% ($p<0.001$).

Effect on Tenderness

The mean tenderness score before the treatment was 1.35 which reduced to 0.55 after the treatment, this decrease of 0.8 + 0.4103 after treatment was statistically significant at the level of 0.1% ($p<0.001$).

Effect on ODI Scale

The mean ODI score before the treatment was 40.32 which reduced to 27.17 after the treatment, this decrease of 13.144 + 3.509 after treatment was statistically significant at the level of 0.1% ($p<0.001$).

Observation on Number of *Putaka* in *Yogavasti*

On the first day of N*iruha* a total 57 *Putaka* were needed, 46 *Putaka* needed on the second day and 34 P*utaka* on third day of N*iruha* for the achievement of *SNL*. In 20 participants, 137 administrations were required for the achievement of *SNL* (Table 5).

Table 5: *Observation on number of Putaka in each Niruha in Yogavasti*

Niruha	N	Putaka	Mean	SD	SE
1st	20	57	2.85	0.988	0.220
2nd	20	46	2.3	0.801	0.179
3rd	20	34	1.7	0.656	0.146

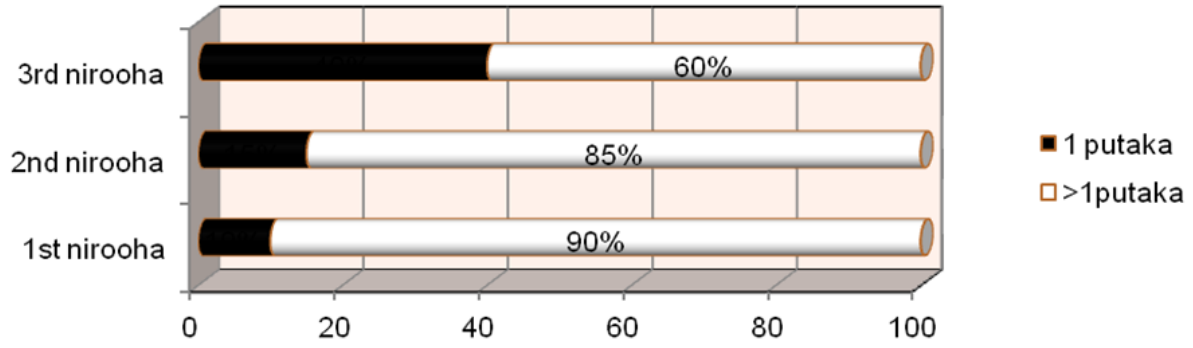

Figure 1: *20 participants according to number of Putaka in each Niruha*

Thus in 20 participants, total 137 *Putaka* (administrations) were done for the attainment of *SNL.* 90% of the participants required more than one administration on 1st N*iruha* day*,* 85% of participants required more than one administration on 2nd day and on the 3rd day of *Niruha* only 60% required more than one administration for the attainment of *SNL* (Figure 1).

Table 6: *Observation on Retention time in Yogavasti among 20 participants*

Yogavasti	1st Niruha				2nd Niruha				3rd Niruha			
Putaka	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
No. of Participants	20	18	13	6	20	17	8	1	20	12	2	-
Mean (Minutes)	1.77	2.11	2.48	2.79	2.13	2.42	2.87	4	2.43	2.91	4.25	-

Retention Time

The mean retention time showed a gradual increase with increase in number of *Putaka* (administrations) on all three days of N*iruha* (Table 6).

4. Discussion

In *Panchakarma* procedures dose is one of the important factor to attain optimum effect of the therapy. *Prasruta pramana* is the unit for the measurement of *Drava Dravya* used in *vasti*. Conventionally one *Prasruta* is equal to 2 *Pala.* But in the context of *Vasti*, it is explained that *Prasruta* should be taken as equal to hollowed palm of outstretched hand of the patient (Trikamji Acharya and Ram Acharya, 1997). *Maadhutailika Vasti* is a *Paadaheena vasti* i.e. total dose of *Vasti* will be 9 *Prasruta* (Ibid Chikitsa sthana 38/118). In this study *Madhutailika vasti* formulated from *AP* was only 240 ml which is approximately one fourth of routinely practiced dose (960ml) of *Madhutailika vasti*. By single administration of this dose, it is difficult to achieve *SNL* so multiple administration was planned. The method of multiple administrations on the same day will give rise to more expulsion of *Dosha* from *Pakvasaya* and hence number of *Putaka* needed for producing *SNL* gradually get reduced on second and third day of *Niruha*.

Event Evaluation Scale showed occurrence of only 4 complaints out of which *Kukshiruja* was predominant. The reason of *Kukshiruja* may be less amount of T*aila* in *Vasti* or irritating property of K*alka* or S*aindhava*. But this symptom was subsided just after passing *Vega* or intake of food. *Adhmaana* was observed in participants in whom four administrations was done. It may be due *Vataprakopa* or more M*ala Nirharana*. A decrease in ESR was observed after treatment, which was significant. No available study reports are there for supporting this data. Further studies should be conducted in this regard.

Retention time showed a gradual increase after each administration on all three days of *Niruha.* The prior sensitization of site of reach of *Vasti dravya* may be one of the reasons for the increase seen in the retention time (Mousumi, 2012). As per classics prolonged retention of *Niruha vasti* is not important because even if not retained for longer time it will produce *Sodhana* effect. No measures are mentioned to prolonged retention time of N*iruha* as told in *Anuvasana* (Trikamji Acharya, 1992).

Kateegraha is mentioned as a symptom of Pakvasayagata Vata Kopa (Harisastri Paradakara Vaidya, 2011). Due to repeated administration of *Vasti,* effect of medicine may be more pronounced, as there is more contact time for the medicine with the colonic mucosa which leads to V*atanulomata* in *Koshta* and ultimately reduction in pain. From *Ayurvedic* perspective, tenderness denotes the association of other D*osha* with V*ata*. Extreme degrees of tenderness are explained in *Amvaata* (Tripathi, 2005), *Sula* (Trikamji Acharya, 1992), *Vatarakta* (Ibid Chikitsa sthaana 29/14), etc where *Vata* is associated or encircled by *Kapha* or *Pitta.* As *Vasti* produces expulsion of *Kapha* and *Pitta* it results in reduction of tenderness.

Vasti has effect in both promotive and curative aspect. In promotive aspect, it stabililizes the age, improve strength, brings quality in life etc (Ibid Siddhi sthaana 1/27). In curative aspect, it relieves stiffness, contractions, aggravated *Vata* in *Sakha* and *Koshta* etc (Ibid Siddhi sthaana 1/32-33). This may be the reason for reduction in ODI for low back pain. Multiple administrations with routinely practiced dose i.e. 960ml take about 2 to 3 hours to complete the procedure (Mousumi, 2012). In the present study multiple administration of V*asti* with *AP* dose takes only 1 to 1 ½ hour for complete procedure. The probable reason was after each administration number of *Vega* and K*lama* symptoms was less. So there was no need for giving more time gap for next administration. Maximum time gap between two V*asti* was 15 to 20 minutes.

Limitations of this study include absence of a control group, the inclusion of which may help to provide precise conclusions to the study and several biases can be avoided. Still the results of the study can be viewed as a preliminary support to practice *Niruha* with a lesser but safer and effective

dose, which is helpful to the clinicians especially for those who prefer OP, based *Panchakarma* practices.

5. Conclusion

It is concluded that *Madhutailika* vasti administered in *AP* is effective in producing *SNL*, safe and effective in reducing pain on VAS scale, tenderness and ODI score in *Kateegraha.*

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Review Article

Magnesium Group with Some Repetorial References: A New Outlook

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Abstract From plant source to the synthetic source, various substances have been used in homoeopathy as medicines, but only if a substance as being used by homoeopaths for therapeutic purpose cannot be termed as a homoeopathic medicine, the very particular substance becomes a homoeopathic medicine only, when applied following the principles of homoeopathy as laid down by Master Hanhemann. Likewise also Magnesium and some of its compounds are used for therapeutic purpose in different morbid conditions and this article states about various compounds of magnesium with their common and also some differentiating features particularly for homoeopathic application, their sphere of actions and even daily requirement of magnesium by an individual. It is to be kept in mind that. homoeopathic application of a substance is different as it is based on respective individualistic feature of a drug, which will vary from species to species (even if they belong to the same genus) in case of plant or animals sources, from compound to compound of a metal or non-metal (in this article various compounds of magnesium) and so on. Thus a thorough study on various compounds of magnesium for homoeopathic purpose, with some references to one of the most accepted repertory i.e. Kent's Repertory and also Synthesis Repertory, will open up a new dimension in therapeutic application.
Keywords *Magnesium group; Physiological role; Relationship; Repertory*

1. Introduction

The history of concept of group study is not new, for a long time after initial development of Homoeopathic Materia Medica; much significance was not given to group study. The history dates back to Dr. Kent who studied & wrote for the first time on this type of study. Later Dr. Clarke & Dr Farrington tried to study drugs in groups wise. But the study of materia medica through groups requires the process of generalization. In this process one has to neglect or sacrifice individual attributes, what one achieves with the individual remedial study in its totality, one can't achieve with the group study. So, we need to take a balance, not rely too much on group study as the contents of group study exclude the individual features of the remedy.

In everyday clinical practice, we often fail to understand a magnesia personality due to lack of data in proving, so these medicines are of very limited use. Mental block is main obstacle in perceiving Magnesium.

2. Medicines in Magnesium Group

Common Medicines

- Magnesium Carbonicum
- Magnesium Muriaticum
- Magnesium Phosphoricum
- Magnesium Sulphuricum

Lesser Known

- Magnesium aceticum, Magnesium artificialis
- Magnesium borocitricum, Magnesium bromatum
- Magnesium flouricum, Magnesium iodum
- Magnesium lacticum, Magnesium metallicum
- Magnesium nitricum, Magnesium oxydatum
- Magnesium silicatum, Magnesium tartaricum
- Magnesium usta

Magnesium suffers from tremendous internal anxiety and insecurity, but this feeling is usually repressed. There is a difference between the words suppression and repression. Suppression means pushing down what comes up, while repression denotes not allowing feelings to come up at all. The emotions are so repressed that even the patient is unaware of them. [7]

The main feeling of Magnesium is the feeling of needing nourishment and care of parents. It is the feeling of a nursing child or that of a fetus, which needs all the protection and nourishment from the mother in order to survive. These feelings in the adult seem so out of place that they have to be repressed, but they continue to be active in the subconscious, producing tremendous internal anxiety, the cause of which is unknown to the patient. The feeling within is of being forsaken (in Synthesis Repertory, rubric: "Forsaken, beloved by his parents, wife and friends, feels not, of being" - Magnesium carbonicum). The feeling is of being forsaken and alone, and very needy of protection.

This manifests as anxiety from small matters, anxiety of such intensity that it cannot be understood. The patient tries to attribute the anxiety to some reason or the other, but knows that it is not the real cause. Another way the anxiety manifests is by physical symptoms and pathology that comes up for no obvious reason. These problems can be well-known psychosomatic conditions like ulcerative colitis, lichen planus, etc., but there seems to be no big tension in the patient's life. They can sit with a composed face and honestly say that they have no tension whatsoever, and yet they have the most severe problems and pains [7].

The coped up Magnesium patient can seem quiet, self-confident, unaffected, composed and matter-of-fact; they not only take care of themselves but even seem to be taking care of others, especially in a motherly way [7].

What give the strongest confirmation of Magnesium are usually the dreams. The repressed emotions of Magnesium patients often manifest in a variety of dreams. These dreams are often symbolic, i.e. the real meaning of the dream is not clear. There may be dreams of houses, weddings, fruits, etc. Some of the dreams that recur in the Magnesium patient are dreams of falling, water, children, dead relatives and death of relatives.

In some Magnesium patients it have been noticed that they may have dreams of dangerous situation but there is no feeling of danger in the dream, e.g. some patients dream that they are standing near a flood of water but they feel nothing - they are just watching it. Another feature of Magnesium patients' dreams is that in most of the dreams there is a feeling of loneliness, of having to face the problem alone, and even having to help someone in danger, e.g. robbers come into the house and the patient is alone. Another theme is the theme of being left behind. Among the pleasant dreams that Magnesium patients get, are usually dreams of being with people, going for a picnic with relatives, meeting friends, Absence of dreams indicates a severe repression. It is further confirmation that there is a strong barrier between the conscious and the subconscious parts of the mind. The Magnesium patients who do not have any dreams are usually the ones with the most severe pathology. In such people you may get two more indications, i.e. they might be sleepless and cannot attribute this to any reason (in Synthetic Repertory, rubric: "Sleeplessness, causeless" - Magnesium carbonicum). The other feature is that though they say they have no dreams, in the morning when they wake up they feel completely unrefreshed as if the mind was active the whole night. This latter phenomenon is also found in Magnesium patients who do remember their dreams. They say: "I dream so much that I am completely exhausted in the morning", and there is no apparent reason in their lives to explain why they should have so many dreams.

These features of tremendous anxiety, insecurity, a need for protection and nourishment, and a strong repression of emotions are seen in an orphan, one who has no one to protect him or whom he can confide in. Dr Kent narrates his experience with Magnesium carbonicum in his lectures on Materia Medica:

"I have observed, especially among illegitimate infants, those that have been conceived by clandestine coition, that they have a tendency to sinking in the back of the head. I once had in charge an orphanage where we had sixty to one hundred babies on hand all the time. The puzzle of my life was to find remedies for the cases that were going into marasmus. A large number of them were clandestine babies. It was a sort of Sheltering Arms for these little ones. The whole year elapsed, and we were losing babies every week from this gradual decline, until I saw the image of these babies in Magnesium carbonicum, and after that many of them were cured" [5].

Magnesium patients have the history of being neglected in some way by the parents. The feeling of being unwanted in the very early years of life, e.g. an unwanted female child, after a series of females, when the parents desperately wanted a male child; or a person who has lost his mother at a very early age, or lost his father at an early age, so that the mother became too busy to look after the child, and the child was looked after by a foster parent. Such people tend to become self-sufficient, non-demanding and repress their emotions to a great extent. This state persists even after changes in their life situation later on.

However the history of such situations in childhood is not mandatory for a patient to develop a Magnesium state. Such a state could have also come from either parent of the patient. We could look into the life situation of the parents if we wish to trace the origin of such a state.

Among the physical symptoms of Magnesium most of them have discharges that stain the clothes and these stains are difficult to wash off, for example perspiration stains the linen yellow and is difficult to wash off. Menses are blackish and leave indelible stains. Also Magnesium patients have either a craving for or aversion to vegetables.

The above picture when combined with certain slowness in a weak, chilly, sweaty, sour smelling patient is typical of Magnesium carbonicum. These patients often have a craving for meat and fruits.

Their main fear is that some mishap would occur, especially to other people. Whenever a relative, especially one whom they depend on, goes out, they constantly feel that that person will meet with an accident. They can be very anxious and may start from slight touch.

The theme of Magnesium can be also seen clearly in Magnesium muriaticum.

Here the Muriaticum element of feeling hurt will also be present. But it is worth studying Magnesium muriaticum separately too.

The main theme of Magnesium muriaticum is the forsaken feeling and disappointment/hurt. They feel the need to be independent and to defend them against hurt.

We can have many presentation of Magnesium muriaticum, for example we can have a girl who is very reserved, has a repulsive, unfriendly mood, would like to strike back when offended but holds herself back out of fear. She cannot confide in anyone and has no friends. She bursts into tears before her menstrual periods. Or we can have a woman who is extremely friendly, takes care of other people. Everybody can lean on her for support. She is very friendly but, at the same time, she is reserved, does not reveal her emotions to the closest person, not even to her husband. She is very nice, nurturing and even motherly. I have seen that Magnesium muriaticum people like small children very much and take up professions involving caring/looking after children. These people can be patient though they feel hurt easily [7].

Physically, Magnesium muriaticum people crave open air. In food they crave vegetables, especially cauliflower, and sweets. They have dark, tarry menses. They often dream of being left behind (forsaken) or lost in a forest. It is interesting to note that Magnesium muriaticum has the dream of being lost in the forest, while Magnesium carbonicum has the dream of being lost in one's own house. But what are the themes of the Magnesium's? [7].

Pacifism

They cannot stand rows and violence. Vithoulkas (2002) has described this very nicely in Mag-m. They are the people who work for Greenpeace and Amnesty International.

But we can find this aversion to quarrels and violence in all the Magnesium. This is expressed in different ways. Firstly, because they find it very difficult to get angry themselves. But also, because they get extremely disturbed by all sorts of violence. They will start to avoid violent people, or violent television programmes. Some of them cannot even watch a western.

Aggression

On the other hand they can be very aggressive. This side does not get emphasized in the literature very much, although we do know Mag-c to have this. The comparison with cham in this aspect is quite appropriate. But Mag-m can also be very aggressive. Whitmont (1982) describes the Magnesium's: 'Magnesium way well be called the most violent, ill-tempered, erratic, but also fearful and depressed remedy of our materia medica'. He talks about Mag-m extensively and calls it the first remedy for manic depressive states.

Fear of loss

An additional theme of the Magnesium's is the fear of loss of friends, family, etc. Mag-c expresses this as 'delusion forsaken by family and friends' and Mag-m as 'delusion he has no friends'. Kent describes Mag-c as a remedy for orphans. In my experience, Mag-c and Mag-m are the most important remedies for children of divorced or quarrelling parents. Quarrels can lead to a break-up, hence the very strong reaction and this reaction can go two ways: either trying to soothe or avoid the quarrel, or starting a row themselves, as a diversion.

Pain

The fear of aggression also expresses itself in a great sensitivity to pain: 'shrieking from pain'. There is fear of the dentist, not entirely unjustified because of the many dental problems. The pains of the Magnesium's are really very severe and terrible. Their fear of pain is therefore understandable.

3. Group Characteristics

Constitution

Physical Make-up [1]

Stout, fair and flabby. Skin is pale, puffy, oily, Waxy with slow healing and scar formation. Premature loose skin, hangs down with lax fiber. Suited to women & children- worn out constitution.

Nervous Temperament

Miasm: - All miasms predominant

Sphere of Action: - GIT, sex organ (Uterus), nervous system, muscles, liver, gall bladder. Tendency to spasmodic affections cramps, colics, spasms, tetany, convulsions and epilepsy, migraine and tension headaches.

Tendency to Relaxation and Paralytic Effects: sprains, strains, subluxations, prolapse, displacements, herniation, ptosis, bearing down, incontinence and paralysis, bleedings and varices.

Poor Reaction

Tendency to Suppuration and Scar-formation (acne): Tendency to hypertrophy, infiltration and indurations. Tumors-benign and cancerous.

Affection of Nutrition: Poor assimilation emaciation and malnutrition. Defective tissues and backward children. Rickets and worm infestations.

Affection of Nutrition: Poor assimilation emaciation and malnutrition, Defective tissues and backward children, Rickets and worm infestations.

Pains: Crampy, griping, constricting, sensation of band, tearing, stitching, boring, cutting etc.

Pains: < Touch, pressure (liver) > Heat, pressure, binding, rubbing.

Periodicity: Every 2nd, every 21st day.

Glands: lymph nodes, liver, prostate, breast, thyroid, thymus etc.

Discharges: protracted, profuse, acrid, sour, foul, indelible, black, thick, sticky, lumpy, green, scanty, tarry, and pitch-like.

Cravings: Meat, vegetables, sour, fruits, bread, sweets, butter and milk.

Aversion: Meat, bread, coffee and milk

At the adult level, expressions are difficult to exhibit, their problems seem to bear no direct correlation with their emotional insecurity, and their feelings are so out of place that it is not expressed at conscious level. It is repressed, not actually aware of it.

Repressions & Anxiety are manifested in the widest spectrum of dreams. Due to their dreams they have unrefreshed sleep, as if mind has been active all night.

Characteristic Physical Symptoms

Affection of Nutrition: Poor assimilation, hence emaciation & malnutrition in children, Defective tissues & backward children, Rickets & worm infections.

Tendency to Relaxation and Paralytic Effects: Sprains, strains, prolapse, displacement, incontinence and paralysis, bleeding, Relaxation of tissues, slowness & dullness.

Pains are of Various Characteristics: Crampy, gripping, constricting, tearing, stitching. Pains > heat, pressure, binding, rubbing, < touch, pressure (liver).

Glands Affected: Lymph nodes, liver, prostrate, breast, thyroid, thymus, endocrine & RES. Mg Iodide imp remedy for goiter. Mag mur is a well-known liver remedy.

Discharges: These are protracted, profuse, acid, sour, foul, fishy, black, thick, sticky, lumpy, green (diarrhoea), tarry, pitch like menses.

Craving for: Meat

Aversion for: Milk

Physiological Role

- It is a metal. World's lightest structural metal
- Periodic table group IIA; 3rd series
- Atomic No.: 12; Wt - 24.312
- Discovered by Sir Hamphry Davy - Na, K, Mg, Cl, Ba
- Greek word - Magnesium
- A district in Thessaly - called Magnesia.

Physiological Functions

- Signaling molecule.
- Mg is the chief constituent of mitochondria, helps in various oxidative processes like oxidative phosphorylation which produces ATP - main source of energy.
- Helps in reaction needs ATP.
- Plays catalyst role in metabolism of major nutrients.
- Helps in maintaining healthy bone density.
- Plays main role in electrical conduction of the heart.
- Relaxing effects on respiratory airways.
- Controls hereditary expressions, hence it is one of the deep acting constitutional medicine.

Daily Requirement [1]

Adult men - 350 mg/day, Adult women - 300 mg/day

Table 1: *Table showing clinical features of Hypo & Hyper magnesemia*

Tissues	Hypo Magnesia	Hyper Magnesia
Causes	Diabetic acidosis, Uremia, Malabsorption syndromes, cirrhosis of liver, hyperparathyroidism, Alcoholism	Renal insufficiency, severe dehydration, diabetic acidosis, laxatives, antacids
Mind	Irritability, fear, noise restlessness, psychotic traits	Depressed, sad, lack of coordination, speech difficulties, lethargy
CNS	Epilepsy, multiple sclerosis	Reflexes, coma, unconsciousness
Muscles	Spasms, cramps, tetany	Weakness, relaxations
Respiration	Increased	Failure
Heart	Arrhythmias, calcifications, necrotic patches	Conduction poor, BBB, abnormal PR & QRS intervals
Blood vessels	Peripheral vasodilatation, calcifications	Inflammation, calcification
Kidneys	Tubular & glomerular degeneration & fibrosis	Necrosis, degeneration, calculi
Liver and Pancreas	Hepatocellular degeneration, Ca and calculi of bile ducts, Necrosis, pancreatitis, diabetes	Fatty degeneration & cirrhosis
Nutrition Bones & teeth	Emaciation, loss of appetite Gums- loose. Caries. Deformed. Brittle Development poor	Nausea & vomiting
Skin	Unhealthy eruptions, Psoriasis, Trophic lesions, alopecia, Nails Deformed, brittle hematomas of ear lobes	Cancerous conditions

3. Magnesium Carb (Homeopathic View)

Main features

- It is related to the older and deeper psoric sickness.
- Aggression is either necessary for a feeling of self-worth or it is very detrimental to self-worth.
- 'Need' to be recognized and accepted, if not done spontaneously they will force you to respect them.
- Kent - first choice for orphans. Rebellious or swallow their aggression.
- Theme of father: too aggressive or too weak.
- Good remedies for children of quarreling/divorced parents.

- The child's muscles are flabby; the child will not thrive in spite of feeding and medicines. Laying the foundations for some serious trouble perfect picture of the Mag. carb. stool, composed of putty-like undigested milk [5].
- She becomes so tired and sweats upon little exertion. She seems to take cold whenever menstruation is coming on.
- These patients take on an appearance as if going into decline, and yet they go on year after year unable to do anything; notable even to keep house.
- Tendency to dryness of the mucous membranes and dryness of the skin. Dryness is a marked feature of this medicine.
- That is the kind of relaxation. Case does not well indicate a remedy that the conditions are latent and there is a tendency to some grave internal disorder.
- There is a kind of marasmus; it produces a state of the body like that prior to tuberculosis.
- The Mag. carb. baby smells sour like the Hepar baby. "Inordinate appetite for meat in children" [5].
- They sometimes set a patient thriving, but mind you, these cases are hard cases to manage. They are difficult to find remedies for. Their trouble is so latent, the symptoms do not come out, and sometimes you have to read between the lines. They are the one-sided cases spoken of by Hahnemann.

General Characteristics [6]

Generalities: - (from Kent's Repertory)

Motion amel: mag-c

Air, open, desire for: mag-c but cold air agg.

Food milk agg: mag-c

Warm food agg: mag-c

Face

Pain, left: mag-c

Night: mag-c

Teeth

Pain pregnancy, during: mag-c

Perspiration

ODOR, sour: Mag-c

Particulars

- Particularly does it affect the roots of the teeth. Every change of the weather the roots of the teeth become violently painful.

- "Stools green, like scum on a frog pond; sour, frothy; with white floating lumps like tallow, bloody, mucous [3].
- The face of the chronic adult case is pale, waxy, sickly and sallow.
- The stomach is a troublesome organ. Patient is always complaining of a sour stomach; sour eructations. Food comes up sour. There is nausea and coming up in the throat of sour food. Pains in the stomach after eating an ordinary amount of food [5].

4. Magnesium Mur (Homeopathic View)

Main Features

- It is a deep-acting antiphonic suited to nervous patient with stomach and liver troubles.
- Essence: Idea that their own aggression or aggression from their mother lead to loss of care from their mother/parents.
- Mind: craving for attention > nagging >irritation if not given > fits of anger.
- Afraid of aggression themselves.
- Can't withstand violence on television/ amongst own family or friends.
- Quarrels between their parents- afraid of divorce: Manic depressive/hysterical, Pacifier - even suppresses own emotions.
- Depression - Abandoned by everyone, parents and friends. Withdraw and become silent. Difficult to make contact with them.
- They feel the world is divided by violence and rows.
- The feelings sometimes overwhelm them and they get dreams of water that might drown them.
- Strong sense of duty - overloads themselves with task-can't keep up-becomes anxious and restless-sleepless - or sleeps but wakes up unrefreshing - always has a sour, dissatisfied, anxious look [8].
- Sleepless due to liver dysfunction-wakes up feeling miserable-mentally dull, unable to concentrate, physically heavy and toxic.
- Agg. - lying down, closing eyes-wakes up, walks around, then again goes to bed.

General Characteristics [6]

Generalities: - (from Kent's Repertory)

Heat, vital lack of: mag-m

Air, open amel: mag-m

Food salt agg: mag-m

Milk agg: mag-m

Head

Pain, wrapping up head: mag-m

Seashore: mag-m

Mind

Anxiety, closing eyes on: mag-m

Vertigo

Morning, rising on: mag-m
Air open amel: mag-m

Mouth

Cracked, tongue fissured: mag-m
Stomach Appetite, capricious: mag-m

Particulars

- Aggravation from salt things, from eating salt food, from salt baths, from sea bathing, and at the seashore from inhaling sea air. [8]
- Chest complaints, liver complaints and constipation at sea. Bromine has complaints of sailors when they come on shore. Magnesia mur. has complaints from going to sea.
- Strong feature in this remedy is indigestion. The stomach becomes less and less able to digest and finally he cannot take a mouthful of food without distress.
- No Power to expel the contents of the bladder, Lack of sensation in the bladder, urethra, cannot tell in the dark whether he is passing urine or not.

5. Magnesium Phos (Homeopathic View)

Main Features

Essence: delusion that they will lose all contacts if they get angry.

Mind: very nervous and fearful. Afraid that the other person will get angry with them.

Afraid that they will say something wrong which might annoy the other person. Afraid of quarrels.

Great desire for contact and communication. But start avoiding for fear of losing them.

Feel they cannot learn fast with fear they will be sent away from school. Get exhausted due to tension.

Like travelling or suffer from Homesickness.

Fears: of being alone, people, disease and death.

Easily frightened.

General Characteristics

- Probably the most important and precious of the remedies derived from the bio-chemical studies of Dr. Schussler. It is one of his twelve “Tissue Remedies”. Generally used in low

potencies, repeated dose, but it works magnificently in the high and highest potencies in very infrequent dosage [4].

- Mag. phos is one of the greatest remedies of dysmenorrhoea of its own kind-pains double the victim up-relieved by heat, hot drinks, hot applications and aggravated by cold [4].
- It is very much like Colocynth, it is no wonder that symptoms in Mag. phos. and Coloc. should present many points of resemblance, since Coloc., which belongs to the vegetable kingdom, contains 3 per cent. of Mag. phos.
- NASH says, “It takes first rank among our very best neuralgia or pain remedies: none has a greater variety of pain” (he details them). “CRAMPING-this last in my opinion is most characteristic and oftenest found in stomach, abdomen and pelvis. In dysmenorrhoea of the neuralgic variety, with the characteristic crampy pains, I have found no remedy equal to it” [4].
- “Alongside the cramping, is its characteristic modality-relief from hot applications”. Here, Nash makes a very important comparison-with Arsenicum.
- He says, I watched this difference”. He says and found that if burning pains were relieved by heat, Arsenicum was almost sure to relieve, while those pains not burning but also relieved by heat were cured by Magnesia phos. I think that this will be found a valuable diagnostic between the two remedies”.
- He says, “During painful menstruation Magnesia phos, is quicker in its action than Pulsatilla, caulophyllum, Cimicifuga, or any other remedy that I know.” He thinks Cimicifuga covers the rheumatic cases better, Mag. phos. those of the purely neuralgic character [4].
- Flatulent colic, forcing patient to bend double, relieved by rubbing, warmth, pressure; accompanied with belching of gas with no relief. Bloated full sensation in abdomen; must loosen clothing, walk about and constantly passing flatus [2].

6. Magnesium Sulph (Homeopathic View) (Bitter Salt)

Picture of Mag Sulph

- Essence: Idea that partner will not love you if you get angry.
- Mind: Afraid of own aggression > suppression > don’t ask for needs >cannot give/receive love anymore >irritability at trifles.
- Aggression > burst of anger (misplaced) > renewed anger or remorse.
- General fear of aggression, of horror stories. Cannot watch violence on television.
- Great desire for warmth & love > searching > dreams of marriage.
- Fears and hyperventilation.
- <morning (waking), undressing(skin) > rubbing, walking.
- Fever from 9 to 10 am. Shuddering in back; heat in one part and chill in another [2].

7. Magnesium Iodum (Homeopathic View)

Picture of Mag IOD

- They have to fight for their existence.
- They have the idea that their existence is being threatened and therefore they have to take an aggressive stand in life.
- Like the other Magnesium's they are extremely sensitive to aggression and violence, even if it is only on television.
- They work hard because they feel that that is how they can justify their existence.

8. Magnesium Lacticum (Homeopathic View)

Picture of Mag Lacticum

- Holding on to people by behaving like a dependent little girl
- They feel as if everything is against them, as if other people are always in the way and are stopping them from getting what they want.
- This makes them impatient and irritable.

9. Magnesium Metallicum (Homeopathic View)

Picture of Mag Metalicum

- Uncertain in relationships.
- They are afraid of making too many demands on the other person in case he will leave.
- So they start to mould themselves to the other person's wishes.
- They dare not stand up for themselves or get angry, instead becoming completely passive to try and hold on to the other person's love.
- Fear of being criticized.

10. Magnesium Nitricum (Homeopathic View)

Picture of Mag Nitricum

- Quarrels make it impossible to enjoy life
- They like to build up a proper relationship because they need it to feel good about themselves.
- They like to enjoy the good things in life together with their partner.
- But because they feel so tense inside they can't help but quarrel, usually about minor issues.
- They don't like it and try to hold it in, but this only makes matters worse.

Relationships

Chronic

- Alkaline Group: Ca, Ba, beryllium
- Ca+ & Mg+ = tubercular miasm
- Silicea: syphilitic & tubercular miasms. Foot sweats & head sweats = Mag mur Indelible discharges
- Scrofulous & rickety children Headache > wrapping.
- Silica anxiety is anticipatory with rigid personality. Mag anxiety is deep-seated = dreams & delusions.
- Baryta = premature age due to arrested development in single organ/single effects. Weak, puny, rickety children. Mag = degenerative process is in tissues– face is wrinkled with premature looks.
- Alumina = spinal nerves - muscular weakness.
- Plumbum = extensors >flexors. Paralysis of single parts with wasting with painlessness in paralysed part.
- Causticum = post-diphtheritic paralysis of pharynx and oesophagus. (lach & cocculus)

- Anxiety = Natr, kali, lyco, ferr, thuja & medo.
- Kali - leaning & dependent personality. Extremely self-centered. Anticipatory & agitational anxiety.
- Phos = dreams - anxiety in dreams & delusions.
- Picric acid = erections and burning in penis(Mag M)
- Merc = enlarged liver < touch (Mag M)
- Ptelea = congestion of liver, enlargement, feeling of weight & pressure > lying right side (Mag. M)
- Zincum = nervous restlessness (Mag. M)
- Nat. Mur = lips chapped & serrated (Mag. M)
- Lyc = > hot drinks (Mag. P)
- Sil = headache from occiput to eye >warmth (Mag. M)
- Milk intolerance = Mag carb = Lyco, Nitric acid, Silicea, lac can & lac deflor.

Acute Relationships

- Cham = vegetable analogue; spasm < from heat (mag. P).
- Neuralgia > moving about, anxiety, restlessness, griping before stools. Yellowish-green like chopped eggs (Mag carb).
- Cina: worm infestation, irritability and sensitivity.
- Rhus tox: rheumatic pains > motion (Mag. Phos).
- Fleeting & shifting pains (Mag. Phos) Pulsatilla < heat, rest > slow motion
- Hemorrhages: Not mentioned as prominent remedy. But mentioned in chest & bloody expectoration - Mag C & Mag M.
- GIT: Rheum: sour stools.(mag carb), Ipecac: nausea & grass green stools.
- Anxiety: Gelsemium: Heart symptoms > motion (Mag. Mur).
- Mag.C & Mag. Ars = anxiety < before menses, < during fever (acon, anac, ars, ign, puls).
- Resp System: - Spasmodic asthmatic breathing - Mag. P (Ant.t, Ars, Ipec, lobelia, nux.V, Puls, spongia). The remedy relationship most of the times is due to the presence of similar type of alkaloids in case of plant sources.

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