



Standardisation of *Dhanyamala Kayaseka* in the management of *Amavata*

SRP Kethamakka¹, Shyju Ollakkod²

H.O.D., Dept. of Panchakarma, Mahatma Gandhi Ayurved College, Hospital & Research Center, Salod (H), Wardha, Maharashtra,² Medical officer, Govt. of Kerala.

Email: technoayurveda@gmail.com

JISM1442H Received for publication: November 24, 2014; Accepted: December 1, 2014

How to cite the article: SRP Kethamakka, Shyju Ollakkod, Standardisation of *Dhanyamala Kayaseka* in the management of *Amavata*, *J-ISM*, V2 (4), Oct-Dec 2014, pp185-192

Abstract:

Dhanyamla Kayaseka is a *Sankara Sweada* procedure is very effective in *Amavata* and acts by its “*Amlatwa*” property and the constant regulated temperature of the *seka* to initiate “*Sweda*”. *Dhanyamla Kayaseka* effects through its absorption from the skin by penetration to reach the target. In this study it is found that the *Dhanyamla* standardized at a pH of 3.03 ± 0.01 and specific Gravity of 1.01 ± 0.01 and is effective in reducing cardinal symptom of *Amavata*, Viz. swelling, joint stiffness, and pain.

Key Words: *Dhanyamla*, *Amavata*, Arthritis, *Sankara Sweda*

Introduction:

Kayaseka is *parimarjana*, defined as “*Parishodhana*” [1] a word colloquially used as cleaning i.e. *Dhavana*. Where in the phrase “*Marjana*” is added with “*Anganirmalyokaranam*” (body cleansing) [2], which means the body waste removal process. The entire process is a complete externally modulated waste material removal or cleansing treatment or *pranidhana*. The “*Pranidhana*” [3] has a meaning of “the visualization of the cause of the *Sthambha* (obstruction).

Correlation of *Amavata* to any pathological states in contemporary medicine is difficult as provincially the acceptance of nomenclature differs and no definitive comparison is drawn.

Materials & Methods:

Study Design:

Simple random comparative clinical trial

Groups: Two Groups

Group A - *Alambushadi Yoga*

Group B - *Dhanyamla Dhara*

Sample size - 9 in each group

Dose & Specifications:

In present study, neither of *Dhanyamla Kayaseka* or *Alambushadi Yoga* (comparative drug in caps) groups received any specific diet instructions or activity schedules. The duration of the trial was 21 days for both groups and 3litres *Dhanyamla Kayaseka* done for 45 minutes. Indexes are drawn from Ayurveda classics to understand the disease nature and for comparison along with standard RA parameters used globally. The procedure from literature was followed to standardize the *Dhanyamla* and its effect on *Amavata* in specific.

Preparation of *Alambushadi yoga*:

Alambushadi yoga is a combination of herbal drugs in a specific proportion mentioned in *Madhava Chikitsa*, *Chakradatta* and *Yogaratanakara*. The combination and proportion of the medicine is each 1 part of *Alambusha* (*Biophytum sensitivum*), *Amalaki* (*Embllica officinalis*), *Vibheetaki* (*Terminalia bellerica*), *Hareetaki* (*Terminalia chebula*) added with 2 parts of *Gokshura* (*Tribulus terrestris*), 4 parts of *Sunti* (*Zingiber officinale*), 5

parts of *Guduchi* (*Tinospora cordifolia*) and 15 parts *Trivruth* (*Operculina terpepethum*).

Definition of Dhanyamla

“Dhanyamla” [9] is conjugate of two different words, viz 'Dhanya' and 'Amla' which means 'fermented cereal' in a broad sense. Ayurveda included its use in *Amlavarga*, *Santhana kalpana* or in *Madya vargha*. Charaka further mentioned *Dhanyamla* use in *Nadi sweda* and *Upanaha* also.

Preparation of Dhanyamla

Preparation follow Sahasrayoga [14] mentioned Dhanyamla ingredients (table-1) are procured and placed in large deep earthenware / steel pot on an oven and to 200 *Prasthas* of boiled water is added and mixed with the powdered drugs (1-9) separately made into loose bundles in clean cloth bags. After adding these drugs into the vessel along with water, it is loosely covered with a lid and heated gently and continuously in moderate fire (approx. 50°C). Every precaution is taken to regulate the temperature of the *Dhanyamla* in the vessel does not rise above its boiling point. From 8th day onwards the required quantity of liquid is taken out and replaced with same quantity of hot water. Sterile precautions maintained through out procedure.

Standardization of Dhanyamla

A sequence of standardization protocol is followed to standardize the *Dhanyamla* in 5 samples collected in 30 days interval. It is observed that the pH is 3.03 ± 0.01 and the Specific Gravity with 1.01 ± 0.01 . The test for presence of Alkaloids and Carbohydrates found positive in all samples (table-2).

(a) Inclusion criteria: -

Age of patients between 15 to 65 years.

Amavata of any *Doshanubandha*

No discriminations of chronicity and severity of disease.

(b) Exclusion criteria: -

Patients below 15 and above 65 years of the age

Patients with complications like deformity, loss of functions and *Grandhi*.

Pregnant women and lactating mother.

Any other systemic disorders other than *Amavata*.

Criteria of Diagnosis:

The signs and symptoms of *Amavata*

mentioned in Ayurveda were the main basis of diagnosis. In addition, the criteria laid down for Rheumatoid Arthritis by American Rheumatism Association were also followed.

Results in Amavata:

In *Dhanyamla* Group four patients (44%) presented with Grade III and five patients (56%) with Grade II *Sandhigraha*. Treatment is significant and there were no patients with Grade III and Grade II was reduced from five to three (33%) *Sandhigraha* (joint stiffness). *Sandhiruk* (joint pain) is presented by one patient with Grade III (11%), four patients with Grade II (44%), and four patients with Grade I (44%) *Sandhiruk*. After the treatment Grade II was reduced from four to one (11%) and four patients (44%) got complete relief in *Sandhiruk* category. *Sandhisotha* is with one patient with Grade III (11%) five patients with Grade II (56%) and three patients with Grade I (33%). After the treatment three patients got complete relief (33%) from *Sandhisotha* and there were no patients with Grade III. Number of patients in Grade II was reduced from five to one (11%). *Sparsa Asahishnuta* is presented by one patient with Grade III (11%), five patients with Grade II (56%) and three patients with Grade I (33%). After the treatment six patients got complete relief (67%) from *Sparsa asahishnuta* and there were no patients with Grade II and Grade III. *Gourava* is a complaint in two patients with Grade II and seven patients with Grade I. After the treatment six patients (67%) got complete relief from *Gourava* and there were no patients with Grade II and Grade III. The results obtained with objective and subjective parameters in both groups are analyzed statistically and discussed here under as Group A Shamana Alambusha with Dhanyamla Kayaseka and the other Group B with Dhanyamla Dhara.

After the *Dhanyamla Kayaseka* treatment pain in numerical rating scale was reduced by 65.77%, and pain in visual analogue scale was reduced by 67.05%. 71.80% improvement was obtained in swelling of 44 joints and 70.62% in S-28 joints. 62.40% improvement in T-28, 44.44% improvement in morning stiffness and 77.78% improvement in heaviness were also obtained. The improvement in chief complaints in this group B were statistically highly significant ($p < 0.001$).

After the *Dhanyamla Kayaseka* and *Alambusha Yoga* treatment pain in numerical rating scale was reduced by 75.41%, and pain in visual analogue scale was reduced by 66.69%. 62.36% improvement was obtained in swelling of 44 joints and 68.94% in S-28 joints. 75.04% improvement in T-28, 66.67% improvement in morning stiffness and 77.78% improvement in heaviness were also obtained. The improvement in chief complaints in this group A were statistically highly significant ($p < 0.001$) (table-3).

64.02% improvement in RIA (Ritchie articular index), 76.35% in improvement in MIA, 54.78% improvement in ANIA (Anjana Nidana Index of *Amavata*), 31.67% improvement in BIA (Basavarajiya Index of *Amavata*) and 72.09% improvement in EAMRAI (Extra Articular Manifestation of RA Index) were obtained after the treatment. Change in all the indices in this group B of *Dhanyamla Kayaseka* treatment were statistically highly significant ($p < 0.001$). 60.24% improvement in RIA, 84.82% in improvement in MIA (Madhava Index of *Amavata*), 77.58% improvement in ANIA, 70.95% improvement in BIA and 57.81% improvement in EAMRAI were obtained after the treatment. Change in all the indices in this group A of *Dhanyamla Kayaseka* and *Alambusha Yoga* treatment were statistically highly significant ($p < 0.001$) (table-4).

70.16% improvement in patient's GDA (Global Disease Activity), 61.94% improvement in physician's GDA and 43.72% improvement in AHA (Ayurvedic Health Assessment) were obtained in group A. Change in GDA and AHA in this group B *Dhanyamla Kayaseka* were statistically highly significant ($P < 0.001$).

81.46% improvement in patient's GDA, 63.50% improvement in physician's GDA and 53.02% improvement in Kashyapa AHA were obtained in group A of *Dhanyamla Kayaseka* and *Alambusha Yoga*. Change in GDA and AHA in this group A were statistically highly significant ($P < 0.001$) (table-5).

46.44% of improvement in AIMS, 62.55% of improvement in physical Disability, 17.65% improvement in walking time, 9.73% improvement in Grip strength and 7.34% improvement in Range of

movements were obtained after the treatment. Change in all the functional parameters in this group B, *Dhanyamla Kayaseka* were statistically highly significant ($p < 0.001$).

50.98% of improvement in AIMS (Arthritis Impact Measurement Scale), 74.81% of improvement in physical Disability, 20.61% improvement in walking time, 21.74% improvement in Grip strength and 6.29% improvement in Range of movements were obtained after the treatment. Change in all the functional parameters in this group A, *Dhanyamla Kayaseka* and *Alambusha Yoga* were statistically highly significant ($p < 0.001$) (table-6).

17.19% improvement in ESR (Erythrocyte Sedimentation Rate), 11.11% in improvement in CRP (C-Reactive Protein), 2.87% improvement in Hb% and 3.76% improvement in Lymphocyte count percentage were obtained after the treatment. Changes in ESR and Lymphocyte count percentage were statistically highly significant. Hb percentage and C reactive protein showed statistically no significant change ($p > 0.05$) in this Group B (*Dhanyamla Kayaseka*). 26.38% improvement in ESR, 44.44% in improvement in CRP, 1.01% improvement in Hb % and 5.15% improvement in Lymphocyte count percentage were obtained after the treatment. Change in ESR, Lymphocyte count percentage and C reactive protein showed were statistically highly significant ($p < 0.001$). But change in Hb percentage is found not significant ($p > 0.05$) in Group A (*Dhanyamla Kayaseka* and *Alambusha Yoga*) as shown below (table-7).

42.71% improvement in DAS (Disease Activity Score), and 35.13% improvement in DAS-28 were obtained after the treatment. Change in disease activity score according to DAS and DAS 28 were highly significant in this Group B (*Dhanyamla*). ($p < 0.001$). 55.46% improvement in DAS, and 43.53% improvement in DAS-28 were obtained after the treatment. Change in disease activity score according to DAS and DAS 28 were highly significant in this group ($p < 0.001$) Group A (*Dhanyamla Kayaseka* and *Alambusha*) (table-8).

The overall result depicts that *Dhanyamla* is effective to provide Complete Remission in 33.34%, Good Response in 44.44% and Moderate Response in 22.22%. There were no cases reported as not

responded (table-9).

Discussion:

Properties of Dhanyamla

The known fact is that the *Dhanyamla*, *amla* or sour in taste serves as an aid in delving into other properties of the *Ama* in the sense that since it is *Amla* in Rasa the associated qualities of *Amla Rasa* as stated in the classics, viz, *Laghu*, *Ushna*, *Snigdha*, *Deepana*, *Vatanulomana* etc. can be safely attributed to it. The properties of Dhanya like *Brimhana*, *Tarpana*, *Balya* and *Vatahara* are also supplemented. Many properties are attributed to *Dhanyamla* are - *Deepana*, *Pachana*, *Rochana*, *Bhedi*, *Vibhandhahrasa*, *Hrudya*, *Klamahara*, *Angasada hara*, *Dahajwarahara*, *Hrudrogahara*, *Panduhara*, *Krimighna*, *Arshohara*, *Grahanihara*, and *Bastisulahara*. In Panchakarma *Dhanyamla* is used as *Astapana* and *Avagaha* [10]. It is indicated to relieve pain in *Arshas* [11] even. Further in *Rajayakshma Dhanyamla Nadi sweda* has been advocated^[12]. *Urusthambha* is advised with *Lepa* and *Seka* with *Dhanyamla* [13]. In brief, *Dhanyamla* cumulatively possess the *Amla Rasa*, *Laghu*, *Snigdha*, *Teekshna*, *Sheeta sparsa Guna*, *Amla Vipaka* and *Ushna Veerya*.

Amavata studies with Dhanyamla

Fully diagnosed and sero positive cases of *Amavata* vis-à-vis Rheumatoid Arthritis were selected after scrutiny in two groups randomly. The duration of the study was 21 days and it is observed with every possible diagnostic tool and parameter available [15]. Observed symptoms are joint stiffness, pain, edema, heaviness and tenderness.

Kayaseka is a trans-dermal cleansing management such as *Abhyanga*, *Parisheka*, *Kayaseka*, etc [4] In *Abhyanga* application is by rubbing (massage) to make unctuous, in turn unctious lubricates and facilitates the absorption of the tropical management effect. The embedded heat transportation modulation facilitates movement of *Dosha* [5]. *Dalhana* was the first person to comment over the absorption and pharmaco-dynamics of the externally mediated unctuous (fatty oil base) materials at the context of *Abhyanga*. He affirms that each 100 of *matra* (32sec approximately) initiated from 300 to 900 takes the oil based medicament for the *Roma koopa Twak Rakta Mamsa Medo Asthi Majja*. At the context he applies a note that the

Tridosha diseases of such region are implied to alter with the effect of medicine, as the *Abhyanga* is *Kapha Vata nirodhana* [7].

Absorption through the skin can be enhanced by suspending the drug in an oily vehicle, hydrated skin, modified dosage form, and rubbing the resulting preparation into the skin. The skin acts as a two-way barrier to prevent absorption or loss of water and electrolytes. The diffusion coefficient indicates the extent to which the matrix of the barrier restricts the mobility of the drug. Increases in the molecular size of the drug will increase frictional resistance and decrease the diffusion coefficient (Franz, 1983); molecules over 1000 daltons usually will not be absorbed easily into normal adult skin [8].

Parameters Controlling Absorption in *Bahiparimarjana Chikitsa*: The absorption of drug into the skin is a function of the nature of the drug, the behaviour of the vehicle, and the status of the skin. Three major variables account for differences in the rate of absorption or flux of different topical drugs or of the same drug in different vehicles like the concentration of drug in the vehicle, partition coefficient of drug between the stratum corneum and the vehicle and diffusion coefficient of drug in the stratum corneum. Apart from the above the points to be considered are large Surface area enhance absorption, increase cutaneous blood flow also enhance absorption, body temperature and blood flow enhance absorption of tropical medicines, transdermal replacement therapy is not a new invention, exists since the birth of Ayurveda.

Factor influencing Bahiparimarjana Chikitsa (Topical Therapy):

Dosage: Minimal medication is sufficient to cover affected body surfaces in repeated applications.

Age: Children have a greater ratio of surface area to mass than adults, and a given amount of topical drug results in a greater systemic dose (Barker *et al.*, 1987).

Regional Anatomic Variation: Permeability is generally inversely proportional to the thickness of the stratum corneum i.e. Avabhasini. However, in certain areas, differences in lipid concentration may affect percutaneous absorption, depending on an individual drug's lipophilicity (Having an affinity for lipids) or hydrophilicity (Having an affinity for

water).

Altered Barrier Function: In many dermatological diseases, the stratum corneum is abnormal, and barrier function is lost. Thus not through rub is indicated, more over many Bahiparimarjana Chikitsa are light in touch.

Application Frequency: Topical agents are often applied twice daily. Thus the stratum corneum may act as a reservoir and allow gradual penetration of a drug into the viable skin layers over a prolonged period of time.

Hydration: Drug absorption is increased with hydration, defined as an increase in the water content of the stratum corneum that is produced by inhibiting trans-epidermal loss of water.

Vehicle: Topical therapy is delivered by various vehicles, most frequently soaks, lotions, solutions, creams, and ointments, progressing in that order

from least to most hydrating.

Conclusion:

Dhanyamla dhara in Amavata is a tropical management is cleansing and Dosha transport facilitator with the capabilities of *Vishyanda*, *Paka* and *Srotomukha Vishodhana*. It pacifies Dosha and a potent externally mediated, temperature regulated, lipophilicity, moistened. The standardization process reveals pH as 3.03 ± 0.01 and Specific Gravity as 1.01 ± 0.01 . It is understood that dermal applications which are hydrophobic in nature (organic solvents *Dhanyamla*) utilized for sustaining prolonged and slow delivery acts on systemic diseases effectively. Thus the *Dhanyamla* becomes an ultimate treatment in *Amavata*.

References

[1] Raja Radha Kanta Deva, Shabda Kalpa druma, part 3, 3rd ed, 1967, Chowkhamba Sanskrit Series Office, PB No 8, Varanasi -

Table-1 Dhanyamla ingredients with proportions and properties

| SNo | Sanskrit Name | Number of parts | Latin Name / Family | Guna | Effect on Dosha |
|-----|---------------|-----------------|-------------------------------------|---|---|
| 1 | Tandula | 5 | Oryza sativa / Graminae | Madhura and Kashaya Rasa, Guru Guna, Madhura Vipaka as Sheeta Veerya | Alleviates Pitta Dosha and provokes Kapha Dosha |
| 2 | Pruthuka | 5 | Oryza sativa / Graminae | It is made out of Tandula | |
| 3 | Kulatha | 5 | Dolichos biflorus / Leguminoceae | Kashaya Rasa, Laghu Vidahi and Sara Guna, Katu Vipaka and Ushna Veerya | Kapha & Pitta Vatahara |
| 4 | Laja | 20 | Oryza sativa / Graminae | Prepared by dry frying of Tandula | |
| 5 | Kangubija | 4 | Setaria italica / Graminae | Kashaya and Madhura Rasa, Guru and Ruksha Guna, Katu Vipaka and Ushna Veerya | Kapha Pitta shamaka and Vata vardhaka |
| 6 | Kodrava | 2 | Paspalum scrobiculatum / Graminae | Madhura-Kashaya in Rasa, Laghu and Ruksha Guna, Katu in Vipaka and Sheeta in Veerya | Alleviates Kapha and Pitta Dosha and provokes Vata Dosha. |
| 7 | Nagara | 1 | Zingiber officinale / Zingiberaceae | Katu rasa, Madhura Vipaka, Ushna Veerya and with Laghu, Snigdha guna | Kapha Vatahara, Vedana sthapaka, Ama Pachaka, SrotoSothaka, Deepaka, Pachaka, Rochaka, SoolapRasamana, Jwaraghna, Swarya, and Vrushya |
| 8 | Nimbuka | 4 | Citrus acida / Rutaceae | Amla Rasa, Laghu Guna, Amla Vipaka and Ushna Veerya | Kapha hara, Agnidhepana, Rochana, Pachana and Trishnanigraha |
| 9 | Dipyaka | 2 | Carum roxburgianum / Umbelliferae | Katu and Tikta Rasa, Laghu, Ruksha Guna, Katu Vipaka and Ushna Veerya | Kapha Vata Samaka, Shoola Prashamana, Rochana and Krimighna |
| 10 | Water | 100 | | Water | |

1, pp 62
 [2] Ibid [1], pp 709
 [3] Ibid [1], pp 709 medina
 [4] Vaidya Jadavji Trikamji Acharya ed, Charaka Samhita sutra 11/55, Nirnaya Sagar Press (1941) reprint, 1984, Chowkhamba Sanskrit sansthan, PB No 139, Varanasi, pp 78
 [5] Ibid [4], Chikitsa, 7/53, pp 453
 [6] Ibid [4], Sutra, 2/15 Chakrapani, pp 25
 [7] Vaidya Jadavji Trikamji Acharya et.al., Susruta Samhita Chikitsa 24/30 - Dalhana, 8th ed, 2005, Chowkhamba orientalia, PB No 1032, Varanasi, pp 488
 [8] Joel G. Hardman et.al., Goodman & Gilman's The Pharmacological Basis of Therapeutics, 9th ed, 1996, McGraw-Hill, Health Professions Division, New York
 [9] Sahasra yoga Edited by Shri K. V. Krishnan Vaidyan et.al. Published by Vidyarabham Publishers, Allepy, 23rd edition April 2000. Pp.122
 [10] Vaidya Jadavji Trikamji Acharya ed, Charaka Samhita Chikitsa 3/259, Nirnaya Sagar Press (1941) reprint, 1984, Chowkhamba Sanskrit sansthan, PB No 139, Varanasi, pp 422
 [11] Ibid [10], 14/44-47, pp 508
 [12] Ibid [10], 8/74, pp 463
 [13] Ibid [10], 27/50-55, 615
 [14] Sahasra yoga Edited by Shri K. V. Krishnan Vaidyan et.al. Published by Vidyarabham Publishers, Allepy, 23rd edition April 2000. Pp.122
 [15] Shyju Ollakkod under the guidance of Dr. K. Shiva Rama Prasad, Evaluation of comparative efficacy of Alambushadi yoga and Dhanyamla Kayaseka in Amavata (Rheumatoid Arthritis), 2004, Department of Kayachikitsa (PG), Post graduate studies and research centre, D.G.M. AYURVEDIC MEDICAL COLLEGE, Gadag - 582 103 seen at <http://www.slideshare.net/ayurmitra/2001amavatashyju>, handled on 15-8-2014.

Table 2 Dhanyamla standardization parameters (Analyzed at K.L.E. society's Pharmacy College, Gadag)

| SNo | Test | Mean | SD | SEM | Remark |
|----------------|-----------------------|--------------------------------|-------|--|--------------|
| 1 | pH | 3.03 ± 0.01 | 0.007 | 0.003 1 | In 5 samples |
| 2 | Specific Gravity | 1.01 ± 0.01 | 0.007 | 0.003 1 | In 5 samples |
| Chemical tests | | | | | |
| | Test | Result | | Remark | |
| 3 | Mayer's Test | Positive in 5/5 samples | | Test for Alkaloids | |
| 4 | Hager's Test | Positive in 5/5 samples | | Test for Alkaloids | |
| 5 | Molish Test | Positive in 5/5 samples | | Test for Carbohydrates | |
| 6 | Benedict's Test | Positive in 5/5 samples | | Test for Carbohydrates Positive (Reducing sugar present) | |
| 7 | Barfoed's Test | Positive in 5/5 samples | | Test for Carbohydrates Positive (Monosaccherides present) | |

Table 3 showing the comparative significance of Chief complaints with Alambusha Dhanyamla (A) and Dhanyamla (B)

| Parameter | Group | Mean before | Mean after | Difference of Mean | % of improvement | SD | SE | t-value | p-value | Remarks |
|--------------------------------|-------|-------------|------------|--------------------|------------------|------|------|---------|---------|---------|
| Pain in Numerical rating scale | A | 13.33 | 4.22 | 9.67 | 75.4 | 2.14 | 0.72 | 12.7 | <0.001 | HS |
| | B | 15.22 | 5.56 | 9.11 | 65.77 | 2.02 | 1.60 | 8.12 | <0.001 | HS |
| Pain in Visual Analogue scale | A | 54.22 | 19.33 | 43.33 | 66.69 | 4.73 | 2.10 | 6.76 | <0.001 | HS |
| | B | 66.67 | 23.33 | 34.89 | 67.05 | 4.06 | 2.10 | 8.19 | <0.001 | HS |
| Swelling of 44 joints | A | 12.78 | 5.44 | 9.78 | 62.36 | 2.40 | 1.06 | 3.22 | <0.001 | HS |
| | B | 14.67 | 4.89 | 7.33 | 71.8 | 2.24 | 1.10 | 8.87 | <0.001 | HS |
| Swelling of 28 joints | A | 11.78 | 4.11 | 8.56 | 68.94 | 2.04 | 1.03 | 5.66 | <0.001 | HS |
| | B | 13.22 | 4.67 | 7.67 | 70.62 | 2.26 | 1.34 | 6.36 | <0.001 | HS |
| Tenderness of 28 joints | A | 13.78 | 4.11 | 8.56 | 75.04 | 2.15 | 1.27 | 7.62 | <0.001 | HS |
| | B | 14.56 | 6.0 | 9.97 | 62.4 | 2.22 | 1.16 | 6.91 | <0.001 | HS |
| Morning stiffness | A | 2.56 | 0.89 | 1.11 | 66.67 | 0.84 | 0.29 | 5.77 | <0.001 | HS |
| | B | 2.24 | 1.33 | 1.67 | 44.44 | 0.70 | 0.20 | 5.55 | <0.001 | HS |
| Heaviness | A | 1.44 | 0.33 | 0.89 | 77.78 | 0.70 | 0.20 | 5.55 | <0.001 | HS |
| | B | 1.22 | 0.33 | 1.11 | 77.78 | 0.67 | 0.11 | 8.0 | <0.001 | HS |

Table 4 showing the comparative significance of different Indexes with Alambusha Dhanyamla (A) and Dhanyamla (B)

| Parameter | Group | Mean before | Mean after | Difference of Mean | % of improvement | SD | SE | t- value | p- value | Remarks |
|--------------------------------------|-------|-------------|------------|--------------------|------------------|------|------|----------|----------|---------|
| Ritchie articular index (tenderness) | A | 19 | 6.22 | 10.7 | 60.24 | 2.89 | 1.05 | 4.02 | <0.001 | HS |
| | B | 17.22 | 6.44 | 12.78 | 64.02 | 2.37 | 1.69 | 6.35 | <0.001 | HS |
| Madhavakara index of Amavata | A | 16.78 | 3.56 | 9.56 | 84.82 | 2.52 | 1.49 | 8.62 | <0.001 | HS |
| | B | 12.78 | 3.22 | 13.22 | 76.35 | 2.09 | 1.7 | 5.59 | <0.001 | HS |
| Anjana nidana index of | A | 8.44 | 2.0 | 4.0 | 77.58 | 1.44 | 0.89 | 8.22 | <0.001 | HS |
| | B | 7.56 | 3.56 | 6.44 | 54.78 | 1.35 | 0.44 | 9.07 | <0.001 | HS |
| Basavarajeya index of Amavata | A | 3.56 | 1.44 | 0.89 | 70.95 | 1.35 | 0.26 | 8.10 | <0.001 | HS |
| | B | 1.89 | 1.0 | 2.11 | 31.67 | 1.12 | 0.35 | 2.53 | <0.05 | HS |
| Extra articular manifestation | A | 3.56 | 1.56 | 2.22 | 57.81 | 1.38 | 0.44 | 4.54 | <0.001 | HS |
| | B | 3.33 | 1.11 | 2.0 | 72.09 | 1.2 | 0.32 | 6.86 | <0.001 | HS |

Table 5 showing the comparative significance of GDA & AHA with Alambusha Dhanyamla (A) and Dhanyamla (B)

| Parameter | Group | Group Mean before | Mean after | Difference of Mean | % of improvement | SD | SE | t- value | p- value | Remarks |
|---|-------|-------------------|------------|--------------------|------------------|------|------|----------|----------|---------|
| Global disease assessment (patient's) | A | 57.0 | 14.0 | 41.1 | 81.46 | 4.51 | 2.8 | 7.42 | <0.001 | HS |
| | B | 59.22 | 18.1 | 43.0 | 70.16 | 3.75 | 1.8 | 8.2 | <0.001 | HS |
| Global disease assessment (physician's) | A | 62.44 | 25.22 | 39.44 | 63.5 | 4.31 | 2.4 | 11.03 | <0.001 | HS |
| | B | 64.44 | 25.00 | 37.22 | 61.94 | 4.08 | 1.84 | 5.92 | <0.001 | HS |
| Ayurvedic health assessment | A | 40.11 | 19.0 | 16.0 | 53.02 | 2.0 | 2.2 | 26.16 | <0.001 | HS |
| | B | 36.56 | 20.56 | 21.11 | 43.72 | 1.96 | 1.0 | 16.0 | <0.001 | HS |

Table 6 showing the comparative significance of functional parameters with Alambusha Dhanyamla (A) and Dhanyamla (B)

| Parameter | Group | Mean before | Mean after | Difference of Mean | % of improvement | SD | SE | t- value | p- value | Remarks |
|------------------------------------|-------|-------------|------------|--------------------|------------------|------|------|----------|----------|---------|
| Arthritis impact Measurement Scale | A | 37.44 | 18.6 | 17.5 | 50.98 | 3.02 | 1.02 | 9.4 | <0.001 | HS |
| | B | 37.33 | 19.78 | 18.78 | 46.44 | 2.48 | 1.94 | 9.06 | <0.001 | HS |
| Physical disability | A | 12.22 | 4.0 | 8.33 | 74.81 | 2.13 | 0.55 | 8.03 | <0.001 | HS |
| | B | 13.33 | 5.0 | 8.22 | 62.55 | 1.64 | 1.0 | 8.33 | <0.001 | HS |
| Walking time | A | 55.89 | 44.89 | 9.78 | 20.61 | 3.65 | 2.16 | 19.9 | <0.001 | HS |
| | B | 55.0 | 45.22 | 11.0 | 17.65 | 1.97 | 1.06 | 9.19 | <0.001 | HS |
| Grip strength | A | 86.89 | 105.11 | 8.89 | 21.74 | 3.74 | 2.2 | 4.71 | <0.005 | HS |
| | B | 86.56 | 95.44 | 18.22 | 9.73 | 4.01 | 2.1 | 3.38 | <0.01 | HS |
| Range of movements | A | 81.56 | 86.11 | 5.33 | 6.29 | 2.23 | 1.73 | 2.55 | <0.05 | HS |
| | B | 76.89 | 82.22 | 4.56 | 7.34 | 2.87 | 0.86 | 6.16 | <0.001 | HS |

Table 7 showing the comparative significance of objective parameters with Alambusha Dhanyamla (A) and Dhanyamla (B)

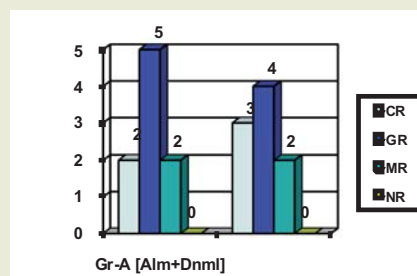
| Parameter | Group | Mean before | Mean after | Difference of Mean | % of improvement | SD | SE | t- value | p- value | Remarks |
|--------------------------------|-------|-------------|------------|--------------------|------------------|------|------|----------|----------|---------|
| Erythrocyte sedimentation rate | A | 35.44 | 28.1 | 5.89 | 26.3 | 4.82 | 1.3 | 5.63 | <0.001 | HS |
| | B | 41.44 | 35.56 | 7.33 | 17.19 | 4.53 | 1.98 | 6.02 | <0.001 | HS |
| C reactive protein | A | 0.67 | 0.22 | 0.11 | 44.44 | 0.67 | 0.18 | 2.53 | <0.05 | HS |
| | B | 0.44 | 0.33 | 0.44 | 11.11 | 0.7 | 0.11 | 1.0 | <0.05 | NS |
| Haemoglobin | A | 10.61 | 10.71 | 0.3 | 1.01 | 0.93 | 0.05 | 2.0 | <0.05 | NS |
| | B | 11.02 | 11.32 | 0.10 | 2.87 | 0.88 | 0.16 | 1.93 | <0.05 | NS |
| Lymphocyte count | A | 40.33 | 38.22 | 1.22 | 5.15 | 1.27 | 0.39 | 5.43 | <0.001 | HS |
| | B | 37.56 | 38.78 | 2.11 | 3.76 | 2.64 | 0.28 | 1.4 | <0.05 | HS |

Table 8 showing the comparative significance of Disease activity score with Alambusha Dhanyamla (A) and Dhanyamla (B)

| Parameter | Group | Mean before | Mean after | Difference of Mean | % of improvement | SD | SE | t- value | p- value | Remarks |
|------------------------------------|-------|-------------|------------|--------------------|------------------|------|------|----------|----------|---------|
| Disease activity score | A | 4.71 | 2.24 | 1.97 | 55.4 | 1.1 | 0.25 | 9.94 | <0.001 | HS |
| | B | 4.76 | 2.78 | 2.47 | 42.71 | 0.96 | 0.19 | 10.13 | <0.001 | HS |
| Disease activity score - 28 joints | A | 6.27 | 3.71 | 2.16 | 43.53 | 1.16 | 0.37 | 6.85 | <0.001 | HS |
| | B | 6.43 | 4.27 | 2.56 | 35.13 | 1.06 | 0.26 | 8.36 | <0.001 | NS |

Table 9 showing the comparative significance of Over all Result with Alambusha Dhanyamla (A) and Dhanyamla (B)

| Result | Dhanyamla +Alambusha (Group-A) | Dhanyamla (Group-B) | Total | % cumulative |
|--------------------|--------------------------------|---------------------|-------|--------------|
| Complete Remission | 2 | 3 | 5 | 27.77 |
| Good Response | 5 | 4 | 9 | 50 |
| Moderate Response | 2 | 2 | 4 | 22.23 |
| Not responded | 0 | 0 | 0 | 0 |
| Total | 9 | 9 | 18 | 100 |



Graph showing table 9 Over all Results