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Ayurveda Research Imperatives: The Role of Case-Control and Cohort Studies in Bridging Evidence Gaps

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Editorial Short Communication

Ayurveda classifies the etiologies of diseases into two fundamental categories: Nija Hetu (indigenous causative factors) and *Agantu Hetu* (exogenous causative factors). While modern medicine correlates these etiologies with pathology and public health frameworks, a significant gap remains when viewed through the lens of Ayurveda's foundational principles.

Ayurveda meticulously defines disease progression at multiple levels—Dosha Prakopa (vitiation of humors), Stotodushti (systemic involvement), Dhatu Dushti (tissue damage), Ashaya Apakarsha Gati (movement of humors and substances across organs), and Amsha-Amsha Kalpana (proportional vitiation of Doshas in different pathologies). Capturing data in this specific diagnostic format is crucial for authentic Ayurveda-based disease understanding.

Today in the era of evidence based sciences we are perusing the Randomized Clinical trial robustly even in Ayurveda clinics, institutions and research organizations. RCTs can be done only after the getting the inference from the data of observational studies. Indian population diaspora have wide range of variation in diet, cultures, geographies and many things, needs to analysed meticulously through different observational, survey, cross sectional and cohort studies. These study will provides the excellent gap analysis for further experimental models for drug development and RCTs. India's diverse population—with its variations in diet, culture, and geography—demands meticulous analysis through case-control, cohort, cross-sectional, and survey studies. Such studies provide essential gap analysis, laying the foundation for experimental models, drug development, and RCTs.

Importantly, observational studies in Ayurveda must integrate Roga Nidana (diagnostic methodology) and Vikriti Vijnana (pathophysiology) to contextualize modern diseases within Ayurveda's diagnostic framework. As the classical dictum states: "Rogam Adau Parikshet Tato Nantaram Aushadham"—the physician must first diagnose the disease before prescribing treatment. Precision in Ayurveda therapies thus depends on accurate diagnosis using

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Ayurveda's own terminologies and methodologies, which can be strengthened through well-conducted cohort and observational studies.

Modern research also acknowledges that "A fairly conducted observational study is far better than a poorly conducted RCT." This reinforces the urgent need to prioritize observational research rooted in Ayurveda fundamentals. Such an approach will not only bridge gaps between traditional and modern sciences but also enhance the credibility and precision of Ayurveda therapies in the global evidence-based healthcare landscape.

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CONCEPT OF AGNI IN AYURVEDA AND ITS PHYSIOLOGICAL CORRELATES: A COMPREHENSIVE REVIEW

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ABSTRACT:

Background- The principal of *Ayurveda* has remained intact in spite of heavy wind changes. One among such principal is the concept of *agni*. *Ayurveda* considers that no disease can develop without the derangement of *agni*. Therefore, the understanding the concept of *agni* is utmost important. **Objective-** To understand the concept of agni, its classifications mainly *Jatharagni, bhutagni* and *dhatwagni* and physiological correlates in modern physiology. **Methods-** We have systematically examined classical Ayurvedic descriptions (from *Charaka, Sushruta, Vagbhata* and authoritative commentaries) and correlated them with current biomedical understanding of digestion and metabolism. **Results-** *Jatharagni*, the digestive fire located in the duodenum *(grahani)*, was correlated with gastric acid secretion, pancreatic enzymes, bile salts, and brush-border enzymes responsible for macronutrient digestion. *Bhutagni*, elemental metabolism at the hepatic level, was associated with hepatic enzymatic pathways of carbohydrate, protein, and lipid metabolism, supported by micronutrients and cofactors. *Dhatvagni*, the tissue-specific fires, consists of anabolic and catabolic processes across plasma, blood, muscle, adipose, bone, marrow, and reproductive systems, with strong parallels to endocrine and enzymatic regulation. **Conclusion-**Despite these parallels, key differences exist. *Agni* is a qualitative and all-encompassing principle, not a discrete chemical compound. It conflates mechanical (stomach churning), chemical (enzymes), thermal and even subtle (electromagnetic/biophotonic) processes in one term.

Keywords- *Agni, Jatharagni, Bhutagni, Dhatwagni*

INTRODUCTION

The concept of *Agni* is the core of *Ayurvedic* physiology, broadly corresponding to the body's metabolic and digestive fire. Classical texts describe *Agni* as the principle responsible for digestion, metabolism and transformation of all substances (food, tissues, waste) within the body. As *Charaka Samhita* states, the Agni is responsible for longevity (*Ayu*), growth (*Upachaya*), strength (*Bala*), complexion (*Varna*), vitality (*Tejas*), immunity (*Ojas*), health (*Swasthya*), motivation (*Utsaha*) and life force (*Prana*)[1]. In practical terms, *Agni* governs digestion of

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food and assimilation of nutrients into body tissues, thereby determining health or disease. As per *Acharya Vagbhatta* imbalance of *Agni* is considered a root cause of any disease[2]. Thus, *Agni* is seen as the mediator of homeostasis and health in Ayurveda, and its maintenance is emphasized for optimal well-being.

Ayurveda classifies *Agni* into multiple categories based on location and function. At the gross level, it is classified into as 3 main types i.e., *Jatharagni* (digestive fire in duodenum), *Bhutagni* (elemental fires in the liver responsible for processing the *Panchamahabhutas*), and *Dhatwagni* (tissue fires in each of the seven tissues/*dhatus*).

METHODS

We have systematically examined classical Ayurvedic descriptions (from Charaka, Sushruta, Vagbhata and authoritative commentaries) and correlated them with current biomedical understanding of digestion and metabolism.

RESULTS

Jatharagni (Digestive Fire)

In *Ayurveda*, *jatharagni* is also called *Kayagni* or *Pachakagni*. It is said to reside in the *Grahani* (duodenum) and governs the breakdown of ingested food into nutritive essence (Sara) and waste (Kitta). *Acharya Chakrapani* mentions that all nutrients first encounter *Jatharagni[3]*, which transforms them for use by the body. Thus *Jatharagni* is considered the chief metabolic fire (said as *Bhagavan*) and directly influences the activity of all other *Agnis* (*Bhuta- and Dhatvagni*).

Importantly, *Jatharagni* (present in Grahani/duodenum) is regarded as the "supreme" among all 3 types of *agni* – as it ignites all other *Agnis* and sets the baseline for metabolism.

The purpose of this review is to bridge these *Ayurvedic* concepts of *Agni* with modern physiological processes. Particular emphasis is placed on mapping *Jatharagni* to gastrointestinal enzymes and motility, *Bhutagni* to hepatic metabolic pathways, *Dhatwagni* to tissue-specific metabolism and endocrine regulation. The aim is to provide a coherent conceptual and clinical framework that integrates *Ayurveda's* fire-of-life metaphor with physiology and biochemistry.

Modern Correlates: The actions of *Jatharagni* correspond to the biochemical processes of gastrointestinal digestion and early assimilation. In contemporary physiology, this can be assumed as gastric acid secretion, digestive enzymes from stomach and pancreas, bile-mediated emulsification, and intestinal brush-border enzymes.

1. Stomach acid (HCl from parietal cells) and pepsin begin protein

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digestion, while pancreatic secretions (alkaline pancreatic juice) provide a suite of enzymes: proteases (trypsin, chymotrypsin, carboxypeptidases, elastase, collagenase), lipases (pancreatic lipase, phospholipase A/B, cholesterol esterase) and amylase.[4]

2. Bile (from liver) has an alkaline pH (8-8.6) and contains bile salts that emulsify fats for digestion. [5]
3. The small intestine produces succus entericus (intestinal juice from crypts of Lieberkühn, Brunner's glands) containing additional enzymes (dipeptidases, nucleases, lactase, sucrase, etc). In sum, these agents collectively achieve the chemical "fire" of digestion in the duodenum and jejunum.[6]

Notably, these enzymes operate optimally in a regulated pH and are released in response to neural and hormonal signals (gastrin, secretin, CCK), akin to the "kindling" of *Jatharagni*.

Bhutagni (Elemental Fires in the Liver)

Bhutagni are described as five "elemental fires" located in the liver (*Yakrit*). Each *bhutagni* corresponds to one of the five *mahabhutas* (earth, water, fire, air, space) and acts on those components in food. After Jatharagni has produced the fundamental food juice (*Ahar Rasa*), Bhutagni is said to "digest" this at an atomic as well as cellular level, converting exogenous (*Vijatiya*) elements into endogenous (*Sajatiya*) forms suitable for tissue building. This can be illustrated with examples of starches, fat and proteins of the food which by the process of digestion are rendered fit to be resynthesized as organism specific carbohydrate, fat and proteins. In other words, the five *Bhutagni* finish processing the digestate into a homogeneous, absorbable biochemical mixture (*Vipaka* often refers to the resulting post-digestive product). Traditional scholars liken *Bhutagni* to a secondary, subtler digestion stage that helps to assimilate the nutrition to further *dhatus.*

Modern Correlates: In contemporary physiology, *Bhutagni* may be viewed as the combinations of the hepatic and metabolic pathways that transform and synthesize nutrients. The liver is the site where absorbed monosaccharides, amino acids, fatty acids and other molecules are interconverted, stored, or repackaged. For example, glucose from the intestine enters hepatocytes and is phosphorylated (via glucokinase/hexokinase) to glucose-6-phosphate, then converted to glycogen (through phosphoglucomutase, glycogen synthase, branching enzymes). Excess glucose can be further processed into acetyl-CoA and triglycerides via glycolysis

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and lipogenesis pathways[7]. Likewise, amino acids entering the liver undergo transamination, deamination and gluconeogenesis to form new glucose or plasma proteins (e.g. albumin, clotting factors)[8]. Lipids delivered as chylomicron remnants are assembled into VLDL particles or broken down by hepatic lipase[9]. All of these processes involve *Bhutagni*-like factors: hepatic enzymes and micronutrients that catalyse molecular transformations.

Indeed, the *Bhutagni* present in the body can be considered as different enzymes in the liver responsible for interconversion once *ahara rasa* reaches the liver. Vitamins also cast as *Bhutagni* catalysts – e.g. fat-soluble vitamins (A, D, E, K) and cofactors (B vitamins) facilitate energy metabolism and biosynthesis. Without these enzymatic and cofactor fires, nutrients would remain intransigent and unusable.

Dhatwagni (Tissue Fires)

Each of the seven *dhatus* (tissues) has its own *Agni* – the ***Dhatwagni*** – which enables the tissue-specific metabolism and nourishment. These are: *Rasagni* (agni in *rasa* i.e., plasma), *Raktagni* (agni in *rakta* i.e., blood), *Mamsagni* (agni in *mamsa* i.e.,muscle), *Medoagni* (agni in *medo* i.e.,fat), *Asthiagni* (agni in *asthi* i.e.,bone), *Majjagni* (agni in *majja* i.e., bone marrow), and *Shukragni* (agni in *shukra* i.e.,reproductive tissues). After food is digested and assimilated at the *Jathara* and *Bhuta* levels, the resulting *Sara* (essence) which is distributed to each dhatu. Each *dhatwagni* then "digests" its appropriate precursor into that tissue's essence. For example, *rasagni* refines chyle into *rasa dhatu* (nutritive fluid), *raktagni* forms blood cells from plasma precursors, *Mamsagni* builds muscle fibers, and so on. This view gives a hierarchical series of metabolic fires culminating in tissue formation.

Modern Correlates: In modern physiology view, *dhatwagni* correlates with endocrine and local metabolic factors governing tissue growth, differentiation and energy utilization. Hormones, growth factors, vitamins and tissue-specific enzymes serve as the "heat" or catalysts within each tissue. For instance:

***Rasagni* (Plasma)**: *Ayurveda* describes *Rasagni* as the *Agni* in plasma/lymph, containing vitamins and enzymes that enable nutrient transformations. Physiologically, this is parallel to circulating hormones and plasma enzymes that regulate baseline metabolism. It also includes insulin and pituitary trophic hormones (which influence overall substrate usage), and immune mediators. Vitamins A, C, E, B-group (biotin, pantothenic acid) function in plasma/lymph biochemistry and can be viewed as part of *rasagni*, many endocrine secretions (from pancreas, pituitary, thyroid, adrenals) are

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encompassed by *rasagni* because they act broadly on nutrient uptake and metabolism.[10,13]

Raktagni (Blood): The *raktagni* corresponds to hematopoietic processes. Ayurvedic commentary identifies intrinsic factor and nutrients like vitamin B12 and folic acid as components of *raktagni* (since they are crucial for erythropoiesis). In modern physiology, erythropoietin (a kidney hormone) and bone marrow growth factors enable red blood cell production from precursors, which can be regarded as the *raktagni* function. The breakdown products from *raktagni* (macro-*Kitta*) can be said as bile, aligning with the idea that heme catabolism (bilirubin in bile) is coupled with blood cell metabolism.[11,15]

Mamsagni (Muscle): Agni of the muscle tissue enables the muscle metabolism. Vitamins (thiamine, ascorbate) and enzymes (myokinase, CPK isoforms) can be said as contributors to *mamsagni*. **IGF-1 and growth hormone** drive muscle growth, while local calcium-handling proteins (troponin, myosin, actin) mediate contraction and adaptation. The breakdown of protein/energy in muscle (e.g. during exercise) involves mitochondria and ATP generation (Krebs cycle enzymes) – which states are part of *dhatwagni* in every cell. In short, *mamsagni* can be viewed as muscle anabolism/catabolism homeostasis under hormonal control.[12,13]

Medoagni (Adipose/Fat): The *medoagni* manages lipid metabolism and storage. The *medoagni* can be correlated with thyroid (thyroxine) and adrenal (glucocorticoid) activity, reflecting modern endocrinology: thyroid hormones upregulate basal metabolic rate (burning fat), while cortisol influences fat distribution. Insulin and leptin also regulate adipose tissue. Thus, hormones controlling appetite and fat deposition (insulin, leptin, thyroid hormone, growth hormone) function as components of *medoagni*. Thyroid (iodine-rich *Tejas* dravya) and glucocorticoids can also be correlated with *medoagni*. Abnormal *medoagni* manifests as obesity (*Meda Vriddhi*) or wasting (*Meda Kshaya*).[13]

Asthiagni (Bone/Connective Tissue): *Asthiagni* underlies bone and skeletal tissue metabolism. Key physiological factors include vitamin D_3, parathyroid hormone (PTH) and calcitonin for calcium/phosphate balance, and growth hormone, estrogen for skeletal maturation. Alkaline phosphatase (a bone enzyme) is another marker of bone formation.[14]

Majjagni (Marrow/Nervous Tissue): The *majjagni* is responsible for bone marrow and nervous tissue nourishment. Bone marrow activity is heavily driven by factors like interleukins, colony-stimulating factors (e.g. GM-CSF), and EPO (for erythropoiesis), which can be seen as *majjagni* components.

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The vitamin B12's role in nerve myelination can also be correlated as a part of *majjagni*. Pituitary and adrenal secretions (e.g. growth hormone, ACTH) are said to constitute *majjagni*, reflecting their broad role in bone marrow stimulation and CNS support. Overall, *majjagni* integrates neuro-hematopoietic metabolism via endocrine signalling. [11, 15]

Shukragni (Reproductive Tissue): Finally, *shukragni* governs fertility and reproductive tissue maintenance. Shukragni can be correlated with vitamins E and H (biotin) and the whole axis of gonadotropic hormones. In modern physiology, this includes GnRH, FSH, LH from the pituitary, and sex steroids (testosterone, estrogen, progesterone) from the gonads. These hormonal signals effect gametogenesis and secondary sexual characteristics. We can also mention sertoli cell, estrogen and LH as part of Shukragni. In sum, Shukragni corresponds to the hypothalamo-pituitary-gonadal endocrine circuit.[16]

Table No.1: *Dhatwagni* and its modern correlates

Agni (Dhatwagni)	Primary Tissue (Dhatu)	Physiological Analogues
1. **Rasagni**	Rasa (plasma/lymph)	Plasma enzymes, vitamins A/C/E/B; insulin, pituitary hormones, cytokines
2. **Raktagni**	Rakta (blood)	Vitamin B_{12}, folate; erythropoietin, bone marrow growth factors (CSFs)
3. **Mamsagni**	Mamsa (muscle)	IGF-1, GH, thyroid; muscle enzymes (creatine kinase, myokinase), calcium-handling proteins (troponin, tropomyosin)
4. **Medoagni**	Meda (adipose)	Insulin, leptin, thyroid hormones, cortisol; adipocyte lipases
5. **Asthiagni**	Asthi (bone/cartilage)	PTH, calcitonin, vitamin D_3; estrogen/androgens, alkaline phosphatase
6. **Majjagni**	Majja (bone marrow)	Interleukins (IL-3, IL-6), EPO; pituitary (GH, ACTH) and adrenal (cortisol) hormones
7. **Shukragni**	Shukra (sperm/ova)	GnRH, FSH, LH; sex steroids (testosterone, estrogen, progesterone) and vitamin E/H

DISCUSSION

This review shows that the *Ayurvedic* concept of *Agni* has clear parallels in modern physiology and biochemistry. At the conceptual level, *Agni* represents any system that transforms and metabolizes substances, whether the fiery element of digestion or the subtle enzymatic processes of the tissues. The tripartite division (*Jathara, Bhuta, Dhatu Agni*) can be the sequential stages of nutrient handling: gastrointestinal digestion (mechanical and

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chemical breakdown), hepatic conversion and distribution (intermediary metabolism), and tissue-level assimilation (cellular metabolism and anabolism).

Clinically, bridging these paradigms can enhance understanding. *Ayurvedic* treatments aimed at *agni* (e.g. digestive tonics, *Pachana* herbs, agni-nurturing diets) can be interpreted in light of their effect on modern physiology (e.g. stimulants of enzyme secretion, prokinetics, regulatory peptides). For example, the *Trikatu* (combination of ginger, black pepper, long pepper) has been shown in studies to increase gastric secretion and gut motility, which corresponds to its traditional use in *Mandagni[17]*.

Integrating Agni with physiology also invites novel perspectives. For instance, the emerging field of **biophotonics** has been mentioned as a way to "decipher Agni" at the subatomic level[18]. Similarly, Ayurveda's emphasis on digestive timing and qualities of food (Laghu and Ushna diet enhancing Agni) resonates with chrononutrition and the thermic effect of food in metabolic research. The concept that each tissue has its own "digestive fire" is akin to recognizing tissue-specific metabolism – for example, muscle's voracious ATP use or bone's continual remodeling. These ideas may inspire interdisciplinary research on bioenergetics from a ayurvedic point of view.

CONCLUSION

Despite these parallels, key differences exist. *Agni* is a qualitative and all-encompassing principle, not a discrete chemical compound. It conflates mechanical (stomach churning), chemical (enzymes), thermal and even subtle (electromagnetic/biophotonic) processes under one term. Modern physiology parses these into specific factors. Care must be taken not to oversimplify or force equivalences where they are conceptual.

So, the concept of *agni* is necessary for understanding metabolism and health. By systematically correlating *agni* categories with digestive enzymes, metabolic pathways and hormones, we have shown that *agni* is not merely metaphorical but reflects observable biological processes. Such bridging holds promise for integrative medicine: preserving the wisdom of *ayurveda* while anchoring it in the rigor of physiology.

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AYURVEDA APPROACH TO SYMPTOMATIC RELIEF IN JAUNDICE - A CASE STUDY REPORT

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ABSTRACT:

Jaundice is a symptom presenting with yellowish discoloration of eyes, urine and skin. In Ayurveda, this cluster of symptoms has been described as disease *Kamala*. The present case report represent the role of Ayurveda in getting the symptomatic relief for the patient of Jaundice with the elevated levels of SGPT , SGOT and Bilirubin. A 40 year old female patient with the complaints of body ache, anorexia, nausea and headache presented to OPD. The diagnosis was made as *Shakhashrita Kamala*. The main line of treatment explained in classics is giving *Pittahar chikitsa*. The treatment was planned for the pacification of *Pitta Dosha simultaneously* administration of drugs which aids liver health was given. This is will help to arrest the further progression of liver damage. Within the treatment of 38 days, the patient got symptomatic relief with the Normal levels of Liver function test.

Key Words: Ayurveda, Jaundice, Kamala, SGPT, SGOT

INTRODUCTION

Jaundice is presented as yellowish discoloration of skin, urine and eyes due to dysfunction in the bile production and excretion. The jaundice is merely a symptom and not the disease whose treatment focuses mainly on supportive care and treatment of underlying disease. [1]. The commones cause of jaundice is Viral Hepatits(Inflammation of Liver. Its course vary from mild and self-limiting to severe inflammation requiring Liver transplant. [2]

There are many misconceptions too prevalent around the globe for its treatment. In traditional Indian belief, certain people claimed to cure jaundice by spiritual practices and the use of Mantras (a sacred utterance, a spiritual sound, mainly are group of words in Sanskrit) along with some precautions, such as avoiding the fried and oily food, avoiding yellow color food especially use of turmeric in food. [3]. Lack of awareness can lead to complications in the Liver disease. The main line of treatment as per medical science is supportive care and treatment of underlying disease. In some cases, the exact cause is not determined and despite of supportive care, 10-20% of cases of Jaundice attains prolonged period of recovery taking upto several months. [4]. this opens the gate of new research to be done regarding the role of alternative medicines like Ayurveda as a single therapy or in combination with contemporary science. Out of many diseases explained in Ayurveda classic text, the symptom of Jaundice resembles with the

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disease *Kamala*. Here, in this case a 40 year old female patient approached to OPD with symptoms of body ache, anorexia, nausea and headache. She had elevated Liver function tests and wished to continue with the Ayurveda medicines only. The base of diagnosis in Ayurveda is *Tridosha. (Vata,Pitta Kapha*). If the d*oshas* are in balanced state, health is achieved. Vitiation of *Tridosha* leads to Disease. [5] The classics explains this disease *(Kamala)* to occur as a complication of *Pandu Roga* (Anemia) which is a *Pitta Pradhan Vyadhi*(Disease). So, the line of treatment explained is to pacify the vitiated *Pitta dosha.* [6]

The patient was treated with medicines which are primarily acting on Pitta and also aids the liver health. Within the course of treatment, the patient got symptomatic relief as well as the deranged Liver parameters was back to normalcy. This article throws the light on application of basic line of treatment principles given in classics and its results.

Case Presentation:-

A 40 year old female patient_visited OPD suffered with body ache, anorexia, nausea and headache. The patient was stable, conscious and well oriented. She had occasional burning micturition along with anorexia and decreased intake of food.

Medical History: - The patient had no H/O HTN or Diabetes.

Diagnostic Assessment:-

The diagnosis was made based on Physical examination and Laboratory investigations (Hematological and urine analysis).

On physical examination, the patient had pulse rate 77/min with 99% Oxygen Saturation with temperature of 97.4 degree Fahrenheit. General examination revealed mild yellowish discoloration on sclera and yellowish micturition with no evidence of skin discoloration. Abdominal examination showed non tenderness and absence of hepatomegaly or Splenomegaly. Hematological tests are described in Table 1 Initial Visit: - 14/09/2024.

Therapeutic Intervention: - The patient was diagnosed as *Kamala* as per Ayurveda and treatment was planned basically keeping the aim to pacify the *Pitta Dosha*. As seen in reports, the patient had low hemoglobin which is described as one of the *Nidan* (cause) of *Kamala*. So, the treatment protocol was given to bring back the *Pitta* in normal stage along with medicines which improves liver health was given.

The medicines and treatment given to patients has been described in table 1.

Table 1:- Treatment given to patient

DATE	Complaints	Treatment given
14/09/2024 - 18/04/2024	*Angamarda*(Bodyache), *Kantha shosha*(Dryness of throat), *Yonidaha*(Burning in	1. Yograj Guggulu 2 TDS 2. Vata Vidhwamsa Rasa 1 TDS

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	Vaginal Area), *Shirah Shula*(headache), *Hrullasa*(Nausea) *Mala Pravrutti :- Samyak* *Mutra pravrutti :- Sadaha* *Kshudha :- nasti* *Nidra:- Adhika*	3. Sutshekhar Rasa 2 TDS 4. Jwarankush Rasa 2 TDS 5. Shirah Shuladi Vajra Rasa 2 BD 6. Avipattikar Churna BD B/F 7. Gomutra Haritaki 2 HS 8. Chardi Ripu Rasa 2 BD (For Symptomatic relief)
18/09/2024 - 23/09/2024	*Kasa (Cough), Chardi(Vomiting), Udardaha(Burning sensation in Abdomen), Dourbalya(Generalized Weakness)* *Mala Pravrutti :- Vibandha(Constipated)* *Mutra pravrutti :- Peeta (Yellowish in color)* *Kshudha :- Samyak, Aruchi(Anorexia)* *Nidra:- Samyak*	1. Vasa Ghanvati 2 TDS 2. Arogyavardhini Vati 2 TDS 3. Sutshekhar Rasa 2 TDS 4. Vata Vidhwamsa Rasa 1 TDS 5. Chardi Ripu Rasa 2 BD 6. Navayas Loha 2 BD 7. Bhumiamalaki Churna + Sharpunkh Churna+ Vidarikanda Churna + Swarna Makshika Bhasma + Praval Pishti + Vasa Kshar TDS 8. Gomutra Haritaki 2 HS 9. Cap. Livotone 1 HS
23/09/2024 to 22/10/2024	Maintenance therapy	1. Vasa Ghanvati 2 TDS 2. Arogyavardhini Vati 2 TDS 3. Sutshekhar Rasa 2 TDS 4. Pippali Tab. 2 TDS 5. Navayas Loha 2 BD 6. Bhumiamalaki Churna + Sharpunkh Churna+ Vidarikanda Churna + Vasa Kshar + Muli Kshara TDS 7. Gomutra Haritaki 2 HS 8. Cap. Livotone 1 HS

Follow up and outcomes:-

In first phase, the patient was given symptomatic treatment but was not helpful much. So, after the diagnosis, the Pitta pacifying drug in the form of powders and tablets was given. Within one week, the patient got relief in symptoms and then the maintenance therapy was given. The timeline of symptoms the blood reports are given in Table 1 and 2.

Table 2 Timeline of symptoms

Symptoms	14/09/2024	18/09/2024	23/09/2024	22/10/2024

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Yellowish discoloration of skin	-	+	+++	-
Weakness	+++	++	+	-
Cough	+++	++	-	-
Nausea and Vomiting	++	+++	-	-
Itching	-	+++	++	-

Table 3: Timeline of blood reports:-

Tests	**Reports on 18/09/2024**	**Reports on 02/10/2024**	**Reports on 22/10/2024**
HEMATOLOGICAL TESTS:- HEMOGLOBIN AND LIVER FUNCTION TESTS			
	8.9 gm/ dl	9.7 gm/dl	10.06 gm/dl
SGPT	2475.39U/L	130.34 U/L	10 U/L
SGOT	1900.21 U/L	83.97 U/L	13 U/L
Total Bilirubin	9.23 mg/dl	6.45 mg/dl	2.10 mg/dl
Direct Bilirubin	7.88 mg/dl	4.41 mg/dl	1.50 mg/dl
Indirect Bilirubin	1.35 mg/dl	2.04 mg/dl	0.50 mg/dl
URINE ROUTINE AND MICROSCOPY REPORT			
Urobilinogen	Present	Present	Nil
Bilirubin	Present 2+	Present 1+	Nil

Results: - Every 15 days, the liver function test was done to assess the liver parameters. The improvement in symptoms has been evidenced within 1 week of medicine. The patient was given only Ayurveda medicines. After 1 week, the medicine to improve liver health and liver functions along with Pitta pacifying drugs were given. At the end of the treatment, the patient got relief form all the symptoms and also normal Liver Function Test was observed.

DISCUSSION:-

The major point of concern here was to make symptomatic relief in Patient and to improve the liver health. For the *Pitta* pacification, the following drugs were used.

Sutshekhar Rasa was continued throughout the treatment. It works on decreasing the *tikshnata and ushnata* of *Pitta*. Its ingredients improve the digestive fire along with that does *Pitta* Pacification. [7]

Vasa *(Adhatoda vasica) works as kapha pitta hara* [8] *and also as Kasaghna (Relieves Cough). So, Vasa Ghanvati along*

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with vasa Kshar has been given to patient from pittahar action.

Navayas Loha *works on elevation of Hemoglobin. [9]*

Along with that ***Arogyavardhini Vati*** *which has 50 % content of Katuki (Picrorhiza kurroa) can be considered as hepato-protective in nature. [10*]

The main combination of powders chosen for the rejuvenation of liver cells and maintaining the health of liver is Bhumiamalaki(Phyllanthus niruri), Sharpunkha (Tephrosea purpurea), Vidarikanda(Pueraria tuberosa), Vasa kshar (Kshar of Vasa(Adhatoda Vasica) and Muli Kshara.

Bhumiamalaki is said to have lignans and turpenes which works effectively for liver protection by its antioxidant activity. [11] Sharpunkha (Tephrosea purpurea) helps in correcting liver function and reducing the level of liver tests. [12] Vidarikanda acts as balya and vatapitta har drug. [13]

Pippali,

possesses *Dipana*, *Rasayana* (rejuvenating), and *Yogavahi* (enhancing the effect of other substances) properties [14]. It helps improve digestion, reduces *Ama* (toxins), and boosts the immune system, thereby helps in anemia. *Pippali* also acts as an immunomodulator, supporting the body in preventing the development of autoimmune disorders [15]. It also works as anti-inflammatory and hemopoeitic action. [16]

Gomutra Haritaki works as a mrudu virechan and also in Pandu Roga [17]. Virechan is considered as best treatment for Pitta Dosha. Also, Gomutra works as kandughna [18].

CONCLUSION

Jaundice is the liver disease caused by impaired bilirubin production or excretion of bilirubin. It is correlated with kamala in Ayurveda texts. It is mainly *Pitta Pradhan*. The present case report explains not only about the literature regarding *Kamala* but also throws light on treatment approach to the disease. By observing the laboratory investigations, it shows the effect of Ayurveda medicines in the level of Haemoglobin as well as SGOT, SGPT and Bilirubin level. This study report opens the new door for the role of Ayurveda in different liver diseases.

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Meta-Analysis of Yoga as a Non-pharmacological Intervention for Primary Dysmenorrhea: Evaluating the Evidence from Randomized Controlled Trials.

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ABSTRACT:

Objective: To determine the pooled effect size of Yoga interventions on pain intensity reduction in individuals with primary dysmenorrhea.

Primary dysmenorrhea, characterized by menstrual pain in the absence of pelvic pathology, affects a significant percentage of women of reproductive age. Yoga has been proposed as a non-pharmacological intervention for pain management. This meta-analysis evaluates the pooled effects of Yoga on pain intensity and associated symptoms in individuals with primary dysmenorrhea based on randomized controlled trials (RCTs). A systematic search was conducted in databases, including PubMed, Science Direct, Scopus, Web of Science, and Cochrane Library. Studies were screened, and data on pain reduction, psychological well-being, and quality of life were extracted. Statistical analyses, including effect size estimation and heterogeneity assessment (I^2 statistics), were performed using RevMan and R software. The results indicate a significant reduction in pain intensity and an improvement in menstrual distress among Yoga practitioners. However, variations in study methodologies necessitate further high-quality trials to confirm these findings.

1. Introduction

Primary dysmenorrhea, commonly referred to as menstrual pain, is a significant public health concern affecting a large proportion of menstruating individuals worldwide.[1] It is characterized by cramping pain in the lower abdomen, typically occurring just before or during menstruation, without any identifiable pelvic pathology.[2] The condition can lead to absenteeism from school or work, decreased productivity, and a negative impact on overall well-being. While pharmacological treatments such as nonsteroidal anti-inflammatory drugs (NSAIDs)[3] and hormonal contraceptives are the standard management strategies, they are often associated with side effects and may not be suitable for all individuals.[4]

Yoga, an ancient mind-body practice that integrates physical postures, breathing techniques and meditation, has gained increasing attention as a potential non-pharmacological intervention for managing menstrual pain.[5] *Yoga* is hypothesized to alleviate dysmenorrhea through multiple mechanisms, including improved blood circulation to the pelvic region, muscle relaxation, reduction of stress and

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inflammation, and hormonal balance. Several randomized controlled trials (RCTs)[6] have explored the efficacy of *Yoga* in reducing menstrual pain[7] and associated symptoms. However, the findings across studies remain varied due to differences in study design, intervention protocols, and participant characteristics.

A meta-analysis[8] provides an opportunity to synthesize available RCTs systematically and quantify the overall effect of *Yoga* interventions on primary dysmenorrhea. By pooling data from multiple studies, this analysis aims to determine whether *Yoga* is a reliable and effective alternative to conventional pain management strategies. This study will assess the impact of *Yoga* on pain intensity among individuals with primary dysmenorrhea, thereby contributing to evidence-based recommendations for integrating *Yoga* into menstrual health management. It will identify gaps in the literature and suggest directions for future research.

2. Methods

2.1 Search Strategy

This meta-analysis was conducted following the **Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)**[9] guidelines and the **Consolidated Standards of Reporting Trials (CONSORT)**[10] guidelines for parallel-group randomized trials. A comprehensive search was performed to identify all RCTs evaluating the effects of *Yoga* on menstrual pain published up to December 2024 in **PubMed, Science Direct,** Scopus, **Web of Science,** and the **Cochrane Library** electronic databases. The search terms used were **"*Yoga*" AND "menstrual cramps" OR "menstrual pain" OR "primary dysmenorrhea".** Additionally, reference lists of relevant articles were reviewed to identify any additional studies. All potentially eligible studies were retrieved, and their full-text articles were assessed to determine whether they met the inclusion criteria.

2.2 Study Selection

To be considered eligible, studies had to meet specific inclusion criteria based on recommendations from the **Cochrane**[11] **Menstrual Disorders and Subfertility Group** and the **Consolidated Standards of Reporting Trials (CONSORT)** guidelines[12]. The first criterion pertained to the study design: only **randomised controlled trials (RCTs) published in full-text and in English** were included. The second criterion focused on the study population: participants had to be of reproductive age, diagnosed with **primary dysmenorrhea**, and experiencing pain that either interfered with daily activities or presented with a high baseline intensity. The third criterion specified the intervention: the study must have evaluated ***Yoga* as a non-pharmacological approach** to managing menstrual pain. The fourth criterion required a **comparative analysis**, where RCTs examined the effects of *Yoga* versus a non-*yoga* control group. Lastly, the fifth criterion addressed outcome measurement: studies had to assess **pain intensity using the Visual Analog Scale (VAS).**[13]

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2.3 Inclusion and Exclusion Criteria

Inclusion Criteria:

- RCTs assessing *Yoga* as an intervention for primary dysmenorrhea.
- Participants aged 18-35 years diagnosed with primary dysmenorrhea.
- Studies reporting pain reduction outcomes using standardized scales such as the Visual Analog Scale (VAS) or the Numeric Rating Scale (NRS).
- Studies published in English.

Exclusion Criteria:

- Studies including secondary dysmenorrhea or gynaecological disorders.
- Non-randomized studies, observational studies, or qualitative research.
- *Yoga* interventions combined with pharmacological treatments without separate *Yoga*-only groups.

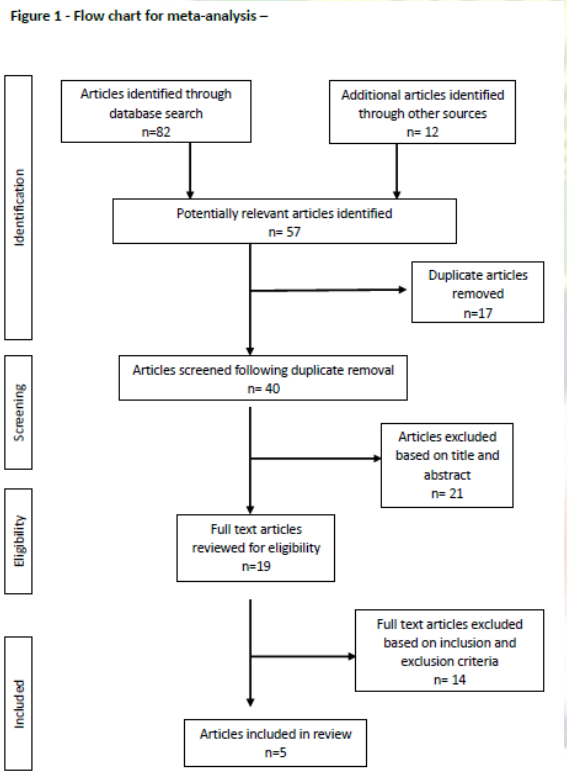

Figure 1 - Flow chart for meta-analysis -

2.3 Data Extraction and Quality Assessment

Two independent reviewers extracted data, including sample size, intervention type, duration, outcome measures, and statistical results. The Cochrane Risk of Bias Tool[14] was used to assess study quality. Disagreements were resolved through consensus.

2.4 Statistical Analysis

Data were analysed using RevMan version 5.4[15] and R software. The primary outcome was pain intensity reduction measured by VAS or NRS[16] scores. A random-effects model was used to calculate pooled effect sizes. Heterogeneity was assessed using I^2 statistics[17], with values >50% indicating significant heterogeneity. Publication bias was evaluated using funnel plots.[18] Sensitivity analyses were conducted to assess the robustness of results by excluding low-quality studies. The results measuring the outcomes are reported as a

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standardised mean difference (Hedge's effect sizes) with 95% confidence intervals. This study's results were considered significant at $p < 0.05$.

3. Results

3.1 Study Characteristics

The literature retrieval process is illustrated in Figure 1. Initially, a total of 94 records related to the search terms were screened. Among these, 8 potential trials were identified from PubMed, 33 from ScienceDirect, 3 from the Cochrane Library, 10 from Web of Science, and 28 from Scopus. After reviewing the titles, 57 relevant articles were identified. However, 17 studies were excluded due to duplication or because they were not published in journals. The abstracts of the remaining 40 studies were then assessed, excluding 21 studies that either did not focus on primary dysmenorrhea or did not evaluate *Yoga* interventions. Ultimately, 19 potential trials were shortlisted from the search results up until December 2024, and their full-text articles were retrieved for further evaluation. After a detailed assessment, 14 studies were excluded: 9 were not randomized controlled trials (RCTs), 3 did not assess menstrual pain intensity, and 2 did not utilize the Visual Analog Scale (VAS) for pain measurement. As a result, 5 articles were included for the review.

3.2 Study participants

The characteristics of the participants included in the 5 selected studies are presented in Table 1. The 5 RCTs corresponding to the included studies were conducted in Turkey, Thailand, Korea, and Iran, respectively. The enrolled participants were recruited by interviews at 5 universities and by telephone calls to child-care centres. The sample sizes in the 5 trials ranged from 34 to 92 participants to 212 participants collectively. The participants' mean ages among the groups from the 5 trials ranged from 19.0 years to 24 years.

3.3 Study intervention

The *Yoga* traditions were heterogeneous between the studies: 1 RCT used *Hatha Yoga* with *pranayama*; another used *Suryanamaskara* and forward bending *asanas* yet another used *Yoga nidra*, *Suryanamaskara*, and *Yoga asanas* such as the cat and fish poses; yet another used *Suryanamaskara* and *Yoga asanas* such as the cat and child poses; and the final RCT used *Yoga asanas* such as the cobra, cat, and fish poses. The length and frequency of the *Yoga* sessions and the program duration for 1 of the trials was 60 mins 2 sessions a week for 12 weeks, yet another trial was for 60 min. once a week for 12 weeks, then one trial was 30 min, 2 sessions a week for 12 weeks; for another trial, 120 min, 5 sessions a week for 12 weeks. The *Yoga* program was performed under the guidance

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of a *Yoga* expert in 1 of the trials, while the participants in 2 of the trials were given a booklet on *Yoga*, and 2 trials involved using a *Yoga* instruction by idea practice video. The 5 RCTs compared practicing *Yoga* to not using any treatment for menstrual pain.

3.4 Study outcome measures

The effect sizes and forest plots illustrating the impact of *Yoga* on menstrual pain control for the included trials are shown in Fig. 2. There was significant statistical heterogeneity among the trials ($Q = 86.49$, $p < 0.001$, $I^2 = 95.6$), which led to the use of random-effects models for the analysis. The mean overall effect size among the trials was −2.14 (95% CI: −3.99 to −0.29, $p = 0.032$).

3.5 Subgroup Analysis

Subgroup analyses were conducted based on intervention type, e.g., *Hatha Yoga* - *pranayama* vs. *Suryanamaskara*, *Suryanamaskara* vs *Suryanamaskara* and *Yoga nidra*, *Suryanamaskara* and *Yoga nidra* vs. *Hatha Yoga*, duration of intervention <12 weeks vs. 12 weeks, and participant characteristics as per age. The total time involved for practicing *asanas* varied, and the findings indicated that longer intervention durations and combined *Yoga* techniques yielded greater pain relief.

3.4 Heterogeneity Analysis

The heterogeneity analysis showed an I^2 value of 95.6%, suggesting high heterogeneity across studies. Sensitivity analysis excluding outliers reduced heterogeneity and confirmed the robustness of findings.

3.5 Publication Bias

The funnel plot analysis indicated low bias, suggesting the need for caution in interpreting the results. The FSN for menstrual pain was 165. These results indicate that publication bias was unlikely in this meta-analysis.

3.6 Adverse effects -

None of the trials included in the study reported any data on the adverse effects of *Yoga*.

Table 1 - Characteristics of the included randomized controlled trials for meta-analysis.

Study, Year Location	Participants Population Sample size (N: EG, CG) Mean age (age range) Drop out n (%)	Intervention		Outcomes	Adverse events	Limitations
		Experimental Group	Control Group			
		Interventions				
		Delivery method				
		Duration				
		Interventionist				

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Aksu A. & Yimaz D., 2024, Turkey	University student (N=60 (EG:30, CG:30) 20 Years (19-22) 0 (0.0)	*Hatha Yoga* 60 mins per day, twice per week, 12 weeks Ideal practice video was given	None	VAS Pain intensity, Quality of life, (p < 0.001)	None	No more duration for continuation.
Kirca N. & Celik A., 2021, Turkey	University student (N=60 (EG:30, CG:30) 20 Years (18-23) 0 (0.0)	*Yoga Asanas* 40 mins. Once per week, 12 weeks Ideal practice Video was given	None	VAS pain intensity EG - (p < 0.001) CG - (p > 0.05)	None	Small sample size
Yonglitthipagon et al., 2017, Thailand	University student (N=34 (EG: 17, CG: 17) 20 years (18-22) 0 (0.0)	*Suryanamaskara* 30 min per day, twice per week 12 weeks booklet of *Yoga* was given	None	VAS pain intensity (p < 0.05) Flexibility (p < 0.00001) Back muscle strength (p < 0.05) Leg muscle strength (p < 0.0001) SF-36 (p < 0.05)	None	Participants were non athlete students No follow up after the 12 weeks *Yoga* A small sample sizes Lack of blinding Subjective outcome measures
Yang & Kim, 2016, Korea	University student N=36 (EG: 18, CG: 18) 22 years (20-23) 0 (0.0)	*Suryanamaskara*, *Yoga nidra*, *Yoga asanas* such as cat and fish poses 120 min per day, 5 days per week 12 weeks *Yoga* expert	None	VAS pain intensity (p < 0.001) Pain duration (p > 0.05) Menstrual distress (p < 0.0001)	None	No double blind No given treatment in control group No measured biochemical variables No control in diet and lifestyle
Rakhshaee, 2011, Iran	University students N=92 (EG: 50, CG: 42) 20 years (18-22) 28 (30.4)	*Yoga asanas* such as cobra, cat, and fish poses 120 min per day, 14 days for menstrual cycle Booklet described the *Yoga*	None	VAS pain intensity (p < 0.05) pain duration (p < 0.05)	None	The obtained data is based on female adolescent participants' responses.

**CG, control group; EG, experimental group; N, number.

Table 2 - Mean, Standard deviation and Standardized mean difference

	Experimental			Control					
Study, Year	**Total**	**Mean**	**SD**	**Total**	**Mean**	**SD**	**SMD**	**95%CI**	**Weight**
Aksu A. & Yimaz D, (2024)	30	3.26	2.15	30	5.31	2.11	-0.31	(-0.81; 0.19)	4.61%
Kirca N. & Celik A. (2021)	30	3.78	2.67	30	4.69	3.21	-0.34	(-1.21; -0.25)	2.40%
Yonglitthipagon et al., (2017)	17	2.30	0.76	17	4.17	1.02	-2.03	(-2.88; -1.18)	14.66%
Yang & Kim, (2016)	18	5.94	0.73	18	6.89	0.83	-1.19	(-1.90; -0.47)	20.55%
Rakhshaee (2011)	50	4.20	0.83	42	7.93	0.66	-4.88	(-5.71; -4.05)	57.77%

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Random Effects Model	**145**			**137**			**-3.38**	**(-1.41 to -0.86)**	**100.0%**

SD, Standard deviation, SMD, Standard Mean Deviation, CI, Confidence level

Figure 2 - forest plot of *Yoga* interventions for primary dysmenorrhea

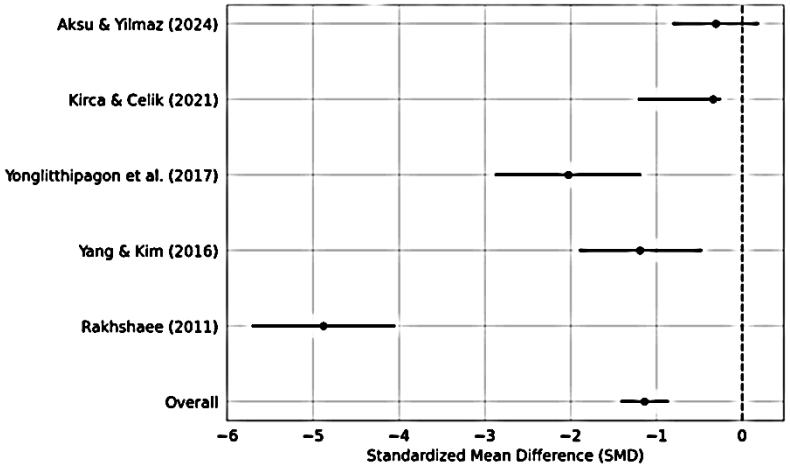

Table 3 - Quality appraisal of all included studies

Study, Year	Sequence Generation	Allocation Concealment	Blinding	Incomplete outcome data	Selective outcome reporting	Other bias	Quality level
Aksu A. & Yimaz D, (2024)	Yes	Yes	Yes	No	No	No	A
Kirca N. & Celik A. (2021)	Yes	Yes	Yes	No	No	No	A
Yonglitthipagon et al., (2017)	Yes	Yes	Yes	No	No	No	A
Yang & Kim, (2016)	Yes	Yes	Yes	No	No	No	A
Rakhshaee (2011)	Yes	Yes	Yes	No	No	No	A

Yes, criteria met and high quality; no, criteria not met and low quality; unclear, unclear whether criteria were met.

4. Discussion

The findings from this meta-analysis, based on Hedge's criteria[19] and involving 212 study participants, demonstrate a significant effect of practicing a *Yoga* program on menstrual pain levels in women with primary dysmenorrhea. Specifically, the results indicate that participating in a *Yoga* intervention significantly reduced menstrual pain compared to those who did not practice *Yoga*. Additionally, a systematic review examining the relationship between *Yoga* practice and primary dysmenorrhea also highlighted that *Yoga* interventions positively impacted the reduction of pain associated with primary dysmenorrhea.

This meta-analysis, which synthesized evidence from five randomized controlled trials (RCTs), confirms the significant effect of *Yoga* in reducing menstrual pain intensity in individuals with primary dysmenorrhea. The pooled Standardized Mean Difference (SMD) of -3.38 (95% CI: -1.41 to -0.86, p = 0.032) highlights a large effect size,

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demonstrating that *Yoga* is an effective, non-pharmacological intervention for managing menstrual pain. These findings align with previous systematic reviews and meta-analyses, reinforcing the clinical relevance of *Yoga* as a complementary therapy for dysmenorrhea.

4.1 Comparison with Previous Research

The results of this study are consistent with previous research demonstrating the efficacy of *Yoga* in modulating pain perception, improving blood circulation, and enhancing relaxation responses. Similar meta-analyses have reported significant pain reduction in participants practicing *Yoga*, suggesting its potential role as an alternative to pharmacological treatments. A systematic review.[20] highlighted that *Yoga* reduces prostaglandin activity, improves autonomic nervous system regulation, and promotes relaxation, all of which contribute to pain relief. Moreover, *Yoga*'s holistic benefits, including stress reduction and improved emotional well-being, make it a favourable intervention compared to conventional therapies that often focus solely on symptom suppression.

4.2 Mechanisms Underlying *Yoga*'s Effectiveness in Dysmenorrhea

Regulation of Prostaglandins: Dysmenorrhea is primarily associated with excessive prostaglandin secretion, leading to increased uterine contractions and ischemia.[21] *Yoga* has been shown to modulate hormonal activity and reduce inflammatory markers[22], thereby alleviating pain intensity.

Neuromuscular Relaxation: *Yoga* postures (*asanas*) enhance pelvic blood flow, reduce muscle spasms, and promote relaxation of the uterus and surrounding musculature.[23]

Endorphin Release: *Yoga* stimulates the production of endorphins, the body's natural painkillers, which can modulate pain perception and increase pain tolerance.[24]

Autonomic Nervous System Regulation: *Yoga* practices like *pranayama* (breathing techniques) and meditation help balance sympathetic and parasympathetic activity, leading to stress reduction, lower cortisol levels, and improved pain-coping mechanisms.[25]

Psychological Benefits: Dysmenorrhea is often associated with anxiety, depression, and mood disturbances. *Yoga*'s mind-body approach promotes mental well-being and resilience, further contributing to its pain-reducing effects.[26]

4.3 Heterogeneity and Methodological Considerations

A key observation in this meta-analysis is the high level of heterogeneity (I^2 = 95.6%), which suggests significant variability in study designs, intervention protocols, and participant characteristics. Several factors contribute to this heterogeneity:

Variability in *Yoga* Protocols: Different studies implemented diverse *Yoga* styles, including *Hatha Yoga*, *Suryanamaskara*, and *Yoga Nidra*, with varying session frequencies and durations. The lack of a standardized protocol may contribute to inconsistencies in effect size across studies.

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Sample Size and Population Differences: The included studies had sample sizes ranging from 17 to 50 participants, leading to variations in statistical power. Additionally, participants differed in terms of age, lifestyle, and baseline pain intensity, further contributing to heterogeneity.

Absence of blinding in Most RCTs: Since *Yoga* interventions are difficult to blind, potential placebo effects and participant expectations may have influenced the results. Future studies should employ objective outcome measures, such as biomarker assessments (e.g., prostaglandin levels), to complement subjective pain scales.

4.4 Clinical and Practical Implications

Despite methodological limitations, the findings support the integration of *Yoga* into primary dysmenorrhea management. Given its non-invasive, cost-effective, and patient-centered approach, *Yoga* can be recommended as an adjunct therapy in clinical settings. Healthcare providers should consider:

Developing Standardized *Yoga* Protocols: Establishing evidence-based guidelines for *Yoga* postures, session frequency, and duration tailored to dysmenorrhea management.

Encouraging Long-Term Adherence: *Yoga*'s cumulative benefits are observed with sustained practice; thus, interventions should focus on habit formation and patient education.

Combining *Yoga* with Conventional Treatments: Integrating *Yoga* with pharmacological and lifestyle interventions may provide synergistic effects, leading to greater pain relief and improved quality of life.

4.5 Future Research Directions

To strengthen the evidence base and improve the clinical applicability of *Yoga* for dysmenorrhea, future research should focus on:

1. Standardized RCT Designs: Implementing well-controlled, multicenter trials with uniform intervention protocols.
2. Long-Term Follow-Up Studies: Assessing the sustained effects of *Yoga* practice beyond the study period.
3. Biochemical and Physiological Investigations: Measuring inflammatory markers, hormonal levels, and autonomic responses to provide mechanistic insights into *Yoga*'s therapeutic effects.
4. Comparative Studies: Evaluating *Yoga* against NSAIDs, hormonal therapies, and other complementary approaches to determine its relative efficacy.
5. Incorporation of Digital and Home-Based *Yoga* Programs: Exploring mobile applications, online platforms, and guided home-based interventions to enhance accessibility and adherence.

5. Conclusion

This meta-analysis suggests that *Yoga* is a promising non-pharmacological intervention

for managing primary dysmenorrhea. While the results are encouraging, further high-quality, large-scale RCTs are needed to establish definitive clinical guidelines for *Yoga* in menstrual pain management. Additionally, integrating *Yoga* into routine menstrual health management programs may be a feasible and cost-effective strategy.

Use of Generative AI in Writing

Generative AI was used solely for basic grammar and spell-check purposes to enhance clarity and consistency in the manuscript.

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Conflict of Interest

The author declares no conflict of interest.

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PREPARATION AND ANALYSIS OF KUMARI ASAV

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ABSTRACT:

Introduction- Many of our Granthas have mentioned that Kumari, i.e., aloe vera, is a plant for women, which means it is very helpful in menstruation-related problems. As Kumari is helpful in balancing Vata and Kapha so it can be useful in PCOS/PCOD. So further study is an effort to prove its action in obesity induced PCOS /PCOD.

Objectives- To prepare and analyze Kumari Asav

Material and method - Reference were taken from Rasaratna Samucchay,

Kumari Swaras -2500ml, Jaggery-1000gm, Haritaki Phalmajja-250gm, Water-2560ml, Honey - 640ml, Dhataki Pushpa - 160gm, and Prakshep Drvyas in the quantity of 10 gm.

Methods- Kumari Swaras and Haritaki Phalmajja Kwath was prepared.Dhoopan was done in the vessel while doing this Guda, Haritaki Phalmajja Kwath and Kumari Swaras was poured and all the Prakshep Dravyas added to it. After that Dhataki Pushpa added and stirred well. Lid of the vessel was covered with the Matkapad. And kept for Sandhan for a month. After one month lid was opened and the mixture was filtered through cloth.

Result - Kumari Asav was prepared and analysed. Specific gravity-1.050, pH-3.89, Sugar content%- 19, Viscosity- 2. 090. Sparsha - soft, Roop- Brownish black, Rasa - Sweet, Gandha - Characteristic.

Conclusion -The prepared formulation was analyzed and can be used in Obesity induced PCOS/PCOD.

Key Words: Kumari Asava, Analytical study, PCOS/PCOD

INTRODUCTION:

Ayurveda is the plant-based indigenous system of medicine practiced in India since ancient times. However, there is a growing need for scientific evidence toward the efficacy of the Ayurvedic formulations.

Kumari (Aloe vera Linn. Burm.), is one of the important medicinal herbs in Ayurveda. The term "*Kumari*" itself denotes the popularity of the herb among women owing to multitude of actions ranging from cosmetic effects to gynaecological effects.

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There are no references about it in *Brihattrayis* but all the *Nighantus* have elaborately mentioned about the properties, action and therapeutic uses of Aloe vera. Various studies have explored therapeutic action of Aloe vera on skin conditions and wound healing, including psoriasis, dermatitis, oral mucositis, burn injuries, and surgical wounds. The Anti-diabetic, Anticancerous, Anti-ulcer, cathartic and anti-inflammatory effects of the herb are also well documented. The present review seeks to throw light on the immense possibilities in the utilisation of this promising herb in Ayurveda in maintaining health of the human reproductive system.

Asavas (fermented infusions) are considered as unique and valuable therapeutics in Ayurveda. These are the medicinal preparations made by soaking the drugs (powder or mixing decoction) in a solution of jaggery for a specified period of time. It undergoes the fermentation process by generating alcohol, which facilitates the extraction of active principles of drugs. The alcohol generated during the process also serves as a preservative.

So the present work is an efforts prepare and analyze the *Kumaryasava* and describe its action in obesity induced PCOS/PCOD.

AIM:

Preparation and analysis of *Kumari Asav*.

OBJECTIVES:

1. To prepare *Kumari Swaras* and *Haritaki Phalmajja Kwath* by using traditional method.

2. To prepare *Kumari Asav*.

3. To analyse *Kumari Asav* Physico-Chemically.

MATERIALS And METHOD:

Kumari is *Shit Viryatmak*, *Madhur Rasatmak* also having *Bhedan Prabhav*. It helps in the balancing all the *Tridoshas*. Also the other ingredients have the properties like *Ushna Virya Madhur Tikta Rasa, Bhedhan* and *Virechak Prabhav* .

Preparation of gel carried out in two steps-

1. Preparation of *Kumari Swaras* and *Haritaki Phalmajja Kwath*

2. Preparation of *Kumari Asav*

1. Preparation of *Kumari Swaras* and *Haritaki Phalmajja Kwath* -

A. Ingredients of *Kumari Swaras* -

Sr. No.	Drug Name	Latin name	Part used (as per API)	Quantity
1.	*Kumari*	*Aloe vera Linn.*	Leaves	2Kg

Table no. 1.1. Ingredients and Quantity of *Kumari Swaras*

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Preparation of *Kumari Swaras*:

Image no. 1.1 Kumari Plant

Image no. 1.2 Preparation Of Kumari Asav

Raw *Kumari* leaves were taken.

↓

And washed with water .

↓

All the *Kumari Gara* was taken

↓

And then it was grinded with the help of mixer.

↓

Kumari Swaras then collected and stored in a glass bottle.

B. Ingredients of *Haritaki Phalmajja Kwath* -

Sr. No.	Ingredient	Latin name	Part used (as per API)	Quantity
1.	*Haritaki Phalmajja*	*Terminalia chebula*	Seed	250gms
2.	Water	-	-	2560 ml

Table no. 1.2. Ingredients and Quantity of *Haritaki Phalmajja Kwath*

Preparation of *Haritaki Phalmajja Kwath*-

250gms of *Haritaki Phalmajja* was taken.

↓

2560ml water is added to it.

↓

Heat is given until it becomes 1/4th in proportion.

↓

The *Kwath* was filtered through the cloth.

↓

And stored in glass vessel

2.Preparation of *Kumari Asava*-

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A. Ingredients of *Kumari Asava* -

Sr. No.	Ingredient	Quantity
1.	*Kumari swaras*	2560ml
2.	*Haritaki Phalmajja Kwath*	640ml
3.	*Guda (*jaggery)	1000gms
4.	*Madh (*Honey)	640ml

Table no. 2.1. Ingredients and Quantity of *Kumari Asava*

Sandhan Dravyas-

Sr. No.	Ingredient	Latin name	Part used (as per API)	Quantity
1.	*Dhataki pushpa*	*Woodfordia fruticosa*	Flower	180gms

Table no. 2.2. Ingredient and Quantity of *Sandhan Dravyas*

Prakshep Dravya-

Sr. No.	Ingredient	Latin name	Part used (as per API)	Quantity
1.	*Jayfal*	*Myristica fragrans*	Fruit	10gms
2.	*Lavang*	*Syzygium aromaticum*	Fruit	10gms
3.	*Kankol*	*Roscoea purpurea*	Fruit	10gms
4.	*Kababchini*	*Piper cubeba*	Fruit	10gms
5.	*Chavyak*	*Piper retrofractum*	Fruit	10gms
6.	*Jaypatri*	*Myristica fragrans*	Leaves	10gms
7.	*Chitrak*	*Plumbago zeylanica*	Fruit	10gms
8.	*Kakadshringi*	*Pistacia integrrrima*	Fruit	10gms
9.	*Pushkarmool*	*Inula racemosa*	Root	10gms
10.	*Behada*	*Terminalia bellirica*	Fruit	10gms
11.	*Tamra bhasma*	*Cuprus*	-	5gms
12.	*Loha bhasma*	*Ferrum*	-	5gms

Table no. 2.3. Ingredients and Quantity of *Prakshep Dravya*

Preparation of *Kumari Asava-*

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Image no. 2.1 Preparation Of Kumari Asav

A Ceramic Jar was taken.

↓

For authentic sterilization, *Dhoopan* was done in the jar.

↓

In the last stage of *dhoopan*, at the base, *Guda* was added.

↓

Then *Haritaki Phalmajja Kwath* and *Kumari Swaras* were poured.

↓

In the last *Prakshep Dravyas,* along with *Dhataki Pushpa,* was added.

↓

After mixing the *Dravyas* ceramic jar was covered with the lid.

↓

To avoid the air entry Lid was again covered with the Cloth slurred with the mud.

↓

The ceramic jar then kept for *Sandhan* prakriya for one month.

↓

After one month the bubble sound was heard at the wall of a jar.

↓

Then the lid was removed and the candle was kept near to the opening of jar the flame was continued that shows the asava was prepared.

↓

The mixture then filtered and stored in the amber colored glass bottles.

Image no. 2.2 Filtering the mixture

Result -

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Kumari Asav was prepared and analysed.

A. Organoleptic Tests-

Shabda- NA

Sparsha - Soft

Roop- Brownish black

Rasa - Sweet

Gandha - Characteristic

B. Physico-Chemical Tests

Sr. No.	Physico-Chemical Test	Results
1.	Specific gravity	1.050
2.	pH	3.89
3.	Sugar content%	19%
4.	Viscosity	2.090

Table no. 3.1. Physico-Chemical Tests of *Kumaryasav.*

DISCUSSION:

***Kumari* has properties mentioned in *Nighantus* are-**

	BPN[1]	***RN[2]***	***Sa. Ni[3]***	***KN[4]***	***PN[5]***
Rasa	*Tikta, madhura*	*Tikta*	*Madhura*	*Tikta, madhura*	*Tikta, madhura*
Guna	*Guru, Snigdha, Pichila*				*Sara*
Virya	*Seetha*	*Seetha*		*Seetha*	*Seetha*
Vipaka	*Katu*	*Katu*		*Katu*	
Dosa karma	*Vata Pittaghni*	*Kapha-Pittahara*	*Pittaghna*		
VyadhiKarma	*Visaghni, gulma, pleeha, yakrit, vriddhi, jwara, grandhi, agnidagdha, visphota, twak roga*	*Visaghni kasaghni, swasaghni, kushtaghni,*	*Krimighna*	*gulma, pleeha, yakrit, vriddhi, jwara, grandhi, agnidagdha, visphota, twak roga, krimihara,*	*gulma, pleeha, yakrit, vriddhi, rajorodha*
Anya karma	*Bhedini, Netrya, Rasayani, brmhani, balya, vrsya,*	*Rasayani*		*Bhedini, Chakshusya, Rasayani, brmhani, balya, vrsya,*	*Rasayana*

Table no. 4.1. Properties of *Kumari.*

The properties of *Kumari* described in various Nighantus indicate predominance of *Tikta* and *Madhura rasa, Sheeta virya*, and *Katu vipaka*, along with actions such as *Pitta shamaka* and *Vata-Pitta hara*. It is also mentioned to have effects on conditions related to *Gulma, Yakrit, Pleeha, Twak roga,* and *Krimi*.

Kumari is described as having *Rasayana, Balya*, and *Bhedana* properties, which suggest its role in maintaining general health and supporting physiological functions.

Haritaki has properties as *Rasa*- All five except *lavan, Tridoshhar, Virya - Ushna, Vipak- Madhur, Guna- Laghu, Ruksha, Lekhaniya, Dipan, Pachaniya, Rasayan, Anulomaniya* etc.

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Gudaa (Jaggery) is traditionally used as a base in formulations and is known to contain minerals and phenolic compounds. It is considered to have supportive roles in digestion and general well-being.

The *Prakshepa dravyas*, being predominantly *Ushna virya* and having *Deepana-Pachana* and *Anulomana* properties, may contribute to improving digestive and metabolic functions.

Overall, the combination of ingredients in Kumari Asava reflects a formulation designed in Ayurveda with multiple properties that may act on digestive, metabolic, and reproductive aspects.

CONCLUSION:

Kumari Asava is a classical Ayurvedic formulation traditionally used in conditions related to the reproductive system. The individual ingredients possess properties described in classical texts that are associated with Dosha balance, digestive support, and general health maintenance.

Based on available descriptions and studies, the formulation may have a role in conditions such as menstrual irregularities and related disorders. However, further systematic clinical evaluation is required to understand its effects and establish its therapeutic utility across various gynecological conditions.

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