IJBPAS, December, 2022, 11(12): 5769-5780

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

UNDERSTANDING HYPERTHYROIDISM, A *ANUKTA VYADHI* & ROLE OF *EKAMOOLIKA PRAYOGAS* IN THE *SAMPRAPTI VIGHATANA*

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Received 6th Feb. 2021; Revised 25th March 2022; Accepted 12th May 2022; Available online 1st Dec. 2022

https://doi.org/10.31032/IJBPAS/2022/11.12.6635

ABSTRACT

Thyroid disorders are prevalent around the globe affecting almost 42 million people in India **[1]** & 1.6 billion people **[2]** are at high risk of getting afflicted in the global level. Hyperthyroidism, a hyper metabolic state is encountered more in females. **Pathologically there will be increased levels of T_3 and T_4 levels**. Ayurveda doesn't have any direct references for this condition hence they can be understood under the spectrum of Anukta Vyadhi. The concept of *Anukta vyadhi* in terms of *samprapti* can be done by *Trividha bodhya,* thereby an attempt has been made to derive a samprapti for hyperthyroidism from Ayurvedic perspective. Clinical manifestations seen in this condition can be understood with that of Atikarshya lakshanas explained in sutrasthana by Acharya charaka. The systemic clinical manifestations due to hyperthyroidism with respect to each system can be substantiated to that of several lakshanas explained by Acharyas and an attempt has been made to elucidate such in this paper. Several research works were done using single drugs which have effectively reduced the T_3 & T_4 (triiodo thyronine & tetra iodothyronine respectively) levels. These drugs include ***Tulasi***, ***Shigru***, *Bilva,* ***Amalaki, Shankhapushpi***, *Sitaphala,* ***Sarpagandha***, *Methika, Mandukaparni* etc. and amongst the above said dravyas some of their role in the samprapti vighatana with scientific studies will be dealt in this review.

Keywords: ***Anukta vyadhi, Trividha bodhya,*** **T_3, T_4 levels, hyperthyroidism,** ***Atikarshya*** **[3]**

INTRODUCTION

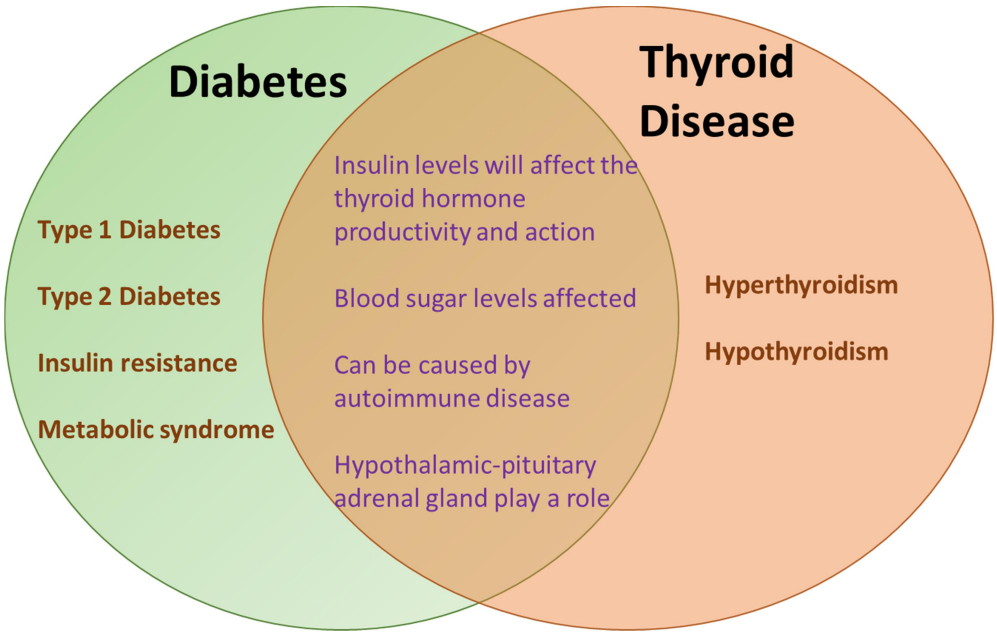
Hormones are chemicals that help in communication between cells and aids in the regulation of body function that are secreted by the ductless endocrine glands directly into the bloodstream. T_3, T_4 & calcitonin **[4]** are hormones secreted by the thyroid, a butterfly shaped endocrine gland situated in the lower part of the neck. T_3 & T_4 are called thyroid hormones. Calcitonin is a parathyroid hormone secreted by the Para follicular cells present in between the gland. Thyroid has been derived from the Greek word *Thyreos* meaning oblong shield and named by Wharton in 1656 **[5]**. The function of thyroid as controller of metabolism was studied and confirmed by George Murray, Hector Mackenzie & Edward Fox **[6]**. Hyperthyroidism or thyrotoxicosis refers to a state wherein there is an excess of circulating thyroid hormones, T_4 or T_3. Thyrotoxicosis is designated as primary when the gland is diffusely enlarged and there are signs of hyper metabolic state; eye signs may or may not be present (Grave's disease) **[7]**. Hyperthyroidism is a state where thyroid function will be in excess. Scholars have understood hyperthyroidism under Anukta vyadhi in Ayurveda.

Hyperthyroidism is classified into three: Primary; Secondary; Thyrotoxicosis without hyperthyroidism. The cause of hyperthyroidism is important to be noted and it is a clinical syndrome where there is excess synthesis of free thyroid hormones in the blood stream. The incidence of this is more common in females than males but less common than the hypothyroidism and varies substantially with location. The major etiology is the graves' disease classified under the autoimmune thyroid disorders which is distinguished clinically from the rest by presence of diffuse thyroid enlargement, ophthalmopathy and rarely pretibial myxoedema.

Thyrotoxicosis **[8]** is designated as secondary where the patient had previously abnormal gland, i.e. nodular goitre (single or multiple), and now assumes hyper functional status (Plummer's disease). The hyperthyroidism of Grave's disease results from the presence in the serum of IgG antibodies directed against the TSH receptor of the thyroid follicular cells. These antibodies are unique in that, once bound to the TSH receptor, they stimulate thyroid hormone production via the adenyl cyclase cAMP system in a manner similar to TSH. They are termed thyroid stimulating antibodies (TSA_b) through negative feedback mechanism. The etiopathogenesis of ophthalmopathy and dermopathy is less well understood but immunologically

mediated damage has been proved in causing this. Thyrotoxicosis in nodular goitre results from the follicles assuming autonomous function and hypersecreting T_4 or T_3. Incidence of mild hyperthyroidism is higher in iodine deficient areas than in iodine sufficient areas& to decrease after introduction of universal salt iodisation programmes.

There have also been instances when a person is diagnosed with another disease coupled with the thyroid disease, for example Diabetes. Studies have described that people diagnosed with Type 1 or Type 2 Diabetes are prone to be diagnosed with thyroid disorders. **Model 1** shows the common factors between Diabetes and Thyroid disease. The body takes help of the thyroid gland to regulate metabolism (converting food to energy). This metabolism is disrupted by thyroid disease leading to the increase in blood sugar consequently increasing the risk of type 2 diabetes. Insulin levels are also affected by thyroid disease. Insulin is eliminated faster as hyperthyroidism increases metabolism making it difficult to control diabetes. Low blood sugar is the consequence of hypothyroidism. An autoimmune form of diabetes (Type 1 Diabetes), often occurs alongside autoimmune thyroid disease. Abnormalities with the HPA axis, where the stress hormone cortisol is being produced, can lead to abnormal insulin and thyroid hormone levels.



Model 1: Common factors between Diabetes and Thyroid disease

The concept of *Anukta vyadhi* **[9]** explained in *Ayurveda* classics helps us to understand the samprapti of unknown diseases. Several drugs which are proven to reduce the severity of the symptoms of hyperthyroidism that have been explained in Samhitas & other ayurvedic scriptures are elucidated in this review.

MATERIALS & METHODS

The references are taken from *Samhitas, Nighantus*, research articles & previous research works with scientific validation supporting the facts.

TREATMENT [10]

This section aims to show the different modes of treatment employed by (1) Western and (2) Ayurveda medicine

Hyperthyroidism is a condition where the symptomatic treatment can be administered in managing the condition as one main reason for the cause is the autoimmunity. Administration of *Dhatupushtikara, brmhana* & other *santarpaniya chikitsa* can be administered in this condition. For autoimmunity, immunomodulatory & immunosuppressant drugs are advised. Ayurveda has the rasayana drugs that can be given to arrest the triggering of auto immunity. In the present scenario several research works have been done on the drugs showing immunomodulatory action and lowers the T_3 & T_4 levels among them some of the drugs are explained below.

1) English system of medicine: [11]

Antithyroid medications: They are Thionamides that inhibit thyroid peroxidase, blocking the synthesis of T_3 & T_4 serving as long term therapy. Methimazole (5-120 mg/day) or Tapazole that is contraindicated in the 1st trimester of pregnancy as it can cause aplasia cutis, birth defects dose related agranulocytosis and Propylthiouracil (50-300mg every 8 hrs orally) is safe for the foetus in the 1st trimester but risks include agranulocytosis (not dose related), hepatotoxicity and rash.

Radioactive iodine ablation: Depending on the size and uptake by the thyroid gland dose is 10-30 millicurie may aggravate the condition during early post treatment period but contraindicated in severe graves orbitopathy, pregnant or nursing women. This will cause hypothyroidism 3-6 months after treatment permanently. In mild cases of graves' orbitopathy, this can be done with concomitant glucocorticoids. Exposure to nonradioactive iodine should be avoided within 3 months before this treatment.

Thyroidectomy: No exposure to adverse effects due to antithyroid medicines or to radiation with little chance of recurrence of graves' disease. Risks of general anaesthesia, damage to laryngeal nerve leading to hoarseness of voice (unilateral) or of respiratory stress(bilateral), parathyroid gland removal leading to permanent hypoparathyroidism.

Beta blockers: The adrenergic symptoms are controlled by beta blockers. Atenolol (25 – 100mg orally once per day) safer than propranolol. The latter decrease T_4 to T_3 conversion and is nonselective in nature. Both cause exacerbation of congestive heart failure or asthma.

Ancillary agents: This includes glucocorticoids, NSAIDS, supersaturated potassium iodide. Glucocorticoids like prednisone (20 – 40mg orally per day up to four weeks) and hydrocortisone (100 mg IV every 8 hours) used in severe hyperthyroidism or thyroid storm to reduce T_4 to T_3 conversion and also in severe subacute thyroiditis but cause hyperglycaemia in patients with diabetes mellitus. Nonsteroidal Anti Inflammatory Drugs (NSAIDS) alleviates the pain due to subacute thyroiditis but it risks patients in affliction to nephrotoxicity, gastro intestinal bleeding. Supersaturated potassium iodide (5 drops orally every 8 hours) is helpful in the treatment but has its limitations as it may aggravate the condition if given before an antithyroid agent. So it is advised to give minimum one hour after antithyroid medicines and not to be given before radioactive iodine treatment.

(2) Ayurveda Medicines

Amalaki: a well-known rasayana drug is proved to have ameliorating action on reducing the effects of hyperthyroidism by reducing the serum T_3 & T_4 levels **[12]**. It is said to possess antioxidant properties that helps in preventing cell damage and in cell repair. For certain lakshana manifesting in this condition amalaki is used as compound formulation in palitya **[13]** the amalaki phala is taken along with mandura, japa pushpa made into kalka & applied on the hairs before bath is beneficial. Then in case of conjunctivitis as ocular manifestation putapaka is done using the kwatha made with the leaves and fruits of amalaki that alleviates the condition.

Sarpagandha: a well-known centrally mediated CNS effect facilitating more sleeping time thereby reduces the adrenergic blocking activity is included in aparajita gana by Susruta that are indicated in mental disorders. The beta blocking action facilitates in the management of hyperthyroidism by alleviating the sympathetic over activity **[14]** several Ayurveda beta-blockers facilitating this are there **[15]**. A research on root extract of Sarpagandha has been found to reduce the both serum T_3 and T_4 levels **[16]** & it is a well-known drug for reducing the blood pressure. The nidrajanaka property is due to its prabhava. It suppresses early ejaculation so useful in treatment of premature ejaculation & early excitement.

Tulasi: a known wonder herb is proved to have modulatory immune response. Its leaf extract is proved in inhibiting the T_4

concentration when administered in male mice **[17]** and is also well known in improving the cellular and humoral immunity. Tulasi swarasa mixed with madhu is used as anjana in conjunctivitis which is one among the manifestations due to the syndrome **[18]**.

Shankhapushpi: is helpful in prevention & alleviation of the initial changes of neuropsychiatric manifestations like restlessness, insomnia, manic depressive & paranoid reactions. It is a known *tridosahara* dravya due to *kasaya, katu, tikta rasa `sita Virya & Madhura vipaka* possess *Medhya & Rasayana* property **[19]**. Study conducted on this has proved in alleviating the symptoms due to hyperthyroidism, also have antiulcer properties acting over the liver enzymes **[20]**. The chloroform fraction of the total ethanolic extract of Convolvulus pluricalis elicited a significant antidepressant like effect in mice by interaction with the adrenergic, dopaminergic & serotonergic systems **[21]**. A study on this in the form of syrup for 9 months was done as comparative study with tranquilisers that has shown shankhapushpi syrup alone has been found to have more effect than the antithyroid and tranquiliser drug(neomercazole and diazepam respectively) **[22]**.

Shigru: a known drug used in Indian cuisine have more anthelmintic(*Krimighna*). In *Dhanvantari nighantu,* Sigru bija is indicated directly in this syndrome i.e., *Medoja galaganda, apaci.* **[23]** *Moringa* seeds show presence of stigmasterol that has been proved in regulation of thyroid function. It is also known Kaphavata samaka, chakshushya medo & vranahara dravya that has prayoga of its leaves made into juice mixed with honey and applied for all eye diseases or simple application of shigru patra kalka **[24]**. Study on the leaf extract in female rats decreased serum T_3 concentration & increased T_4 concentration that suggests the inhibitory activity in the peripheral conversion of T_4 to T_3 by the extract **[25]**.

DISCUSSION

Thyroid secretes more amount of thyroxine(T_4) than triiodothyronine(T_3) and T_4 is not metabolically active until converted to T_3 and can be considered as prohormone. Thyroid hormone synthesis is controlled by both hypothalamic & pituitary TSH secretion in a negative feedback loop. Thyroid hormones stimulate the diverse metabolic activities as it targets all the cells of the body, stimulates protein synthesis and mitochondrial activity in the cells leading to exchange of energy. This energy will be stored for maintaining body homeostasis and also be dissipated as heat with raise in metabolic activity. This condition eventually leads to an increase in basal metabolic rate which elevates the

body temperature. Increased thyroid hormone levels stimulate fat mobilization, carbohydrate & protein metabolism. It also influences in rise of heart rate, cardiac contractibility & cardiac output & also have effects on myocardium. They promote vasodilatation leading to enhanced blood flow to organs. Too much low levels of thyroid hormones tend individual to feel mentally sluggish, while raised levels induce anxiety and nervousness.it has direct action on muscles, kidneys & GI system.

The clinical manifestations **[26]** of hyperthyroidism can be seen in all systems as **cutaneous manifestations**: warm and moist skin, heat intolerance, excessive sweating, pruritis, hair fall, clubbing of fingers (thyroid acropachy), premature hair greying. As **cardiovascular**: palpitations, sinus tachycardia, atrial fibrillation, increased blood pressure. As **gastrointestinal manifestation**: increased appetite, weight loss, raised gastric emptying and intestinal motility, hyper defaecation, diarrhoea, anorexia, nausea, etc. As **neuromuscular manifestation:** restlessness, nervousness, insomnia, manic depressive and paranoid reactions. In general, metabolic changes like shortness of breath, fatigue, hyperactivity, weight loss, anaemia, raised oxygen release from haemoglobin, increased thirst. **Reproductive manifestations** like oligo menorrhoea, infertility, delayed sexual maturation, gynecomastia and impaired sexual function in men. **Ocular manifestations** like lid retraction, periorbital oedema, redness and swelling of conjunctiva, impaired eye movement, ophthalmopathy include eye discomfort, excess tears, proptosis, corneal exposure and damage, diplopia, lid lag. Laboratory findings found in this condition will be supressed serum TSH & cholesterol levels, elevated serum free thyroxine, total T_4 & T_3. The systemic effects are shown in the **Table 1**.

Table 1: Systemic effects of Thryrotoxicosis

System	Outcome
Skin	Moist palm, Hyper hydrosis, Utricaria, Itching, exacerbation of eczema
Overall	Weight reduction, Nervousness, Irritability, Heat intolerance, Fatigue, Sleep Deprivation
Eyes	Periorbital Oedema, Lid lag and retraction, Chemosis, Exopthalmos, Redness, Loss of vision
Central Nervous system	Irritability, Psychiatric conditions, Stupor, Coma
Central Vascular System	Tachycardia, Cardiomegaly, Heart Failure, Rhythm Disturbance
Respiratory	Dyspnoea
Bone	Reduction of Minerals and Bone density
Fertility/Reproduction	Infertility, Irregular periods
Metabolic	Hyperglycaemia, Hypercalcaemia
Neuromuscular	Tremor, Myopathy, Paralysis

The action of thyroid hormones is analogous to concept of Agni in Ayurveda **[27]**. Agni has been described as the one that carries everything moves everywhere, ability to enter the minutest channels that is responsible for the transformation of substances for further functioning of the body. Chakrapani describes it as kayagni and the thyroid hormones can be considered as amsa of kayagni and Vagbhata says that its amsa resides in every Dhatu. This can be understood as it is all-pervasive in the body that helps in both catabolism and anabolism.

For understanding the mode of action of various drugs to maintain the condition before it metastasizes, lakshanika chikitsa is followed and these samprapti could be understood by considering the following (A) Trividha bodhya (Anukta vyadhi); (B) Dhatvagni atideepta **[28]** causing Dhatu kshaya: Atikarshya lakshanas; (C) Avarana vata **[29]**; (D) Concept of bhasmakagni **[30]**.

Trividha bodhya: Under the Anukta vyadhi context, it is explained that the chikitsa should be done based on the Dosha and Dushya that involves in the samprapti to understand the concept of anukta vyadhi. Samprapti of hyperthyroidism can be understood in this perspective as

Nidana: Intake of Rooksha, teekshna ahara with respect to bhasmakagni (more iodine intake, anupa mamsa especially sea foods)

Prakruti (Dosha and Dushya): kapha kshaya, vata and pitta prakopa, rasa, rakta, mamsa

Adhishthana: Amashaya samuttha

Dhatvagni atideepta: As per Vagbhata, the amsha of jatharagni lies in each dhatu. Assessing the dhatu poshana (vriddhi & kshaya) in the case of bhasmaka, due to the intensity of atyanta teekshnata of agni the dhatwagni atideepta occurs leading to dhatukshaya and the lakshanas of atidipti is explained for each Dhatu that correlates with the symptoms of hyperthyroidism. The lakshanas manifested is also similar to the atikarshya lakshanas explained by caraka in ashta nindita purusha Adhyaya such as karshya, balakshaya, trushna, daaha, moorcha, bhrama, kaasa, shosha, vitshosha, deharookshata, karmakaaritva, bahuroga, mrtyu.

Table 2: Dhatwagni atideepta lakshanas with respect to hyperthyroidism symptoms

Rasa	**Shula, hridayatama on doing less work**	**Palpitation, dyspnoea on exertion**
Rakta	**Rooksha twak, parusha, sphutita twak**	**Heat intolerance**
Mamsa	**Shushkata of sphik, greeva, udara**	**Weight loss**
Meda	**Sandhisphutana, glani, tanutva of udara, akshi aayasa**	**Weight loss, wasting of abdominal fat, eye muscles(lid lag, periorbital oedema)**
Asthi	**Prapatana of kesha, loma, nakha,**	**Hairfall, bursitis of shoulder joint**

	Smashru, Dwija, srama, Sandhishithilata,	**decreased BMD osteoporosis**
Majja	**Dourbalya, mukhashosha, pandutva, sadana, sramah**	**Increased thirst, fatigue, palor**
Shukra	**Klaibya, shukraavisarga**	**Delayed sexual maturation, gynecomastia, impaired sexual functions in men**

Avarana vata: The dushita pitta is concealing the udana vata which is responsible for the strength and energy of the body to do the daily chores along with speech development leads to the development of pitta prakopa lakshanas such as moorcha, daha, srama, bhrama i.e., Pittavrita udana that are seen as systemic clinical manifestations seen in this syndrome. Looking from the perspective of the pathogenesis of graves' disease a common cause for this syndrome goes similar to the samprapti explained above, autoantibodies **[31]** i.e., TSAb develop that activate TSH receptors by binding to them mimicking normal TSH but in due course of time lead to overstimulation of the gland causing the disease symptoms.

Bhasmakagni: When kapha is in kshaya the vata and pitta is in prakopa making the agni more intense that is explained as ***anilaanalam*** which burns the food instead of digestion and in its absence, starts burning the Dhatus and cause shosha till the ojas that cause severe weakness and ultimately death.

CONCLUSION:

The present article has focussed more on understanding samprapti of hyperthyroidism with reference to Anukta vyadhi & based on lakshanas several concepts can be interpreted for its understanding as dhatwagni atideepta lakshanas, bhasmakagni, Atikarshya lakshanas, avarana vata along with the symptoms that come in this condition. Several single drugs are useful in managing the condition though they are not indicated directly but has been documented in several books along with mode of usage and many drugs has been proved to have antithyroid properties through in vitro and animal studies and classically. Some drugs like amalaki, Sarpagandha, shankhapushpi, tulasi and shigru had been highlighted with possible amayika prayogas and research studies. But due to the unawareness about the scope of this science treatment aspects are not known widespread so the scope further lies in knowing about this by doing several clinical trials like clinical trial done on shankhapushpi and combinations can be made and medicines can be prepared in curtailing the symptoms due to this condition.

ACKNOWLEDGEMENT

I hereby thanking Dr. Nandesh Mohan, Dr. Saranya K and Dr. Sundararaghavan P for

helping me in writing this review with their valueable suggestions and inputs.

REFERENCES

[1] Unnikrishnan AG, Menon UV. Thyroid disorders in India: An epidemiological perspective. Indian J endocrinol metab. 2011 Jul; 15(Suppl 2): S78-81. Doi: 10.4103/2230-8210.83329. PMID: 21966658; PMCID: PMC3169866.

[2] V Alam Khan, MA Khan, S Akhtar, "Thyroid disorders, etiology and prevalence", – J Med Sci, vol. 2, pp.89-94, 2002. – researchgate.net

[3] Vaidya Yadavji Trikamji Acharya Charaka Samhita edition 1994 sutrasthana21/11-15, Chaukhambha Sanskrit sansthan, Varanasi Page:117

[4] Dr. V.V.L.Prasuna, A textbook of thyroid in Ayurveda. ED.1, 2010, Chowkhamba Sanskrit series office, Varanasi

[5] Ibid

[6] Ibid

[7] Dennis l Kasper, Eugene Braunwald, Anthony S Fauci , Stephen L Hauser, Dan I Longo, Jarry Jameson , Mc Grawhill medical publishing wing Ed. 15 Harrisons principles of internal medicine

[8] Ibid

[9] Vaidya Yadavji Trikamji Acharya Charaka Samhita edition 1994 sutrasthana18/44-46, chaukhambha Sanskrit sansthan, Varanasi Page:108

[10] Dr. V.V.L.Prasuna A textbook of thyroid in Ayurveda. Ed.1,2010, Chowkhamba Sanskrit series office, Varanasi Page: 75-77

[11] https://scholar.google.co.in/scholar?q=hyperthyroidism=scholarly=articles&hl=en&as_sdt=0&as_vis=1&oi=scholar#d=gs_qabs&u%23p%3D8ZkNHnV8-6EJ

[12] Panda S and Kar A. Fruit extract of Emblica officinalis ameliorates hyperthyroidism and hepatic lipid peroxidation in mice. Pharmazie 2003; 58(10): 753-5

[13] Dr.P.V.Sharma, Classical use of medicinal Plants reprint 2004, Chaukhamba visvabharati Page:37

[14] Panda S, Kar A. regulation of hyperthyroidism by Rauwolfia serpentine root extract in mice. Pharm Pharmacol commun 2000; 6:517

[15] Lakshmi C M. Scientific basis for ayurvedic Therapies. 2004, CRC Press LLC, New York Washington D.C, P.134: 133-48

[16] Dr.P.V.Sharma, Classical use of medicinal Plants reprint 2004,

Chaukhamba visvabharati Page: 387

[17] Bharthi V, Kavya N, Shubhashree MN, Bhat S. Herbal approach to management of thyroid disease – a review. J Ayu Herb Med 2017;3(1):48-52

[18] Dr.P.V.Sharma, Classical use of medicinal Plants reprint 2004, Chaukhamba visvabharati Page: 168

[19] Dr. Prakash L Hegde, Dr.Harini A, A text book of Dravyaguna volume II Ed. 1, 2014, Chowkhamba publications, Varanasi Page: 766

[20] Bharthi V, Kavya N, Shubhashree MN, Bhat S. Herbal approach to management of thyroid disease – a review. J Ayu Herb Med 2017;3(1):48-52

[21] Dhingra D, Valecha K Evaluation of the antidepressant like activity of Convolvulus pluricalis choisy in the mouse forced swim & tail suspension tests. Med sci Monit. 2007 July; 13(7) BR 155-61

[22] Gupta, R.C., Singh, P.M., Prasad, G.C., & Udupa, K.N (1981). Probable mode of action of sankhapushpi in the management of thyrotoxicosis. Ancient science of life, 1(1), 49-57

[23] Dr. Prakash L Hegde, Dr.Harini A, A text book of Dravyaguna volume II Ed. 1, 2014, Chowkhamba publications, Varanasi Page: 788

[24] Ibid

[25] Bharthi V, Kavya N, Shubhashree MN, Bhat S. Herbal approach to management of thyroid disease – a review. J Ayu Herb Med 2017;3(1):48-52

[26] V.V.L.Prasuna A textbook of thyroid in Ayurveda. Ed.1,2010, Chowkhamba Sanskrit series office, Varanasi Page: 93-95

[27] Dr. C. Dwarakanath Digestion and metabolism in Ayurveda Ed.1, Chowkhamba krishnadas academy, Varanasi Page: 41-42

[28] Vaidya Yadavji Trikamji Acharya Charaka Samhita edition 1994 sutrasthana17/63-67, chaukhambha Sanskrit sansthan, Varanasi Page:103

[29] Susruta, Susruta Samhita with Nibandha sangraha and nyaya Chandrika commentaries, Ed. Vd. Y.T. Acharya, Chaukhamba surbharati prakashan 2014(Reprint), nidanasthana 1/35 Page: 263

[30] Dr. C. Dwarakanath Digestion and metabolism in Ayurveda Ed.1,

Chowkhamba krishnadas academy, Varanasi Page: 41-42

[31] T.N. Pattabiraman, Textbook of biochemistry Ed.2, 2002, All India publishers & distributors Page: 307

Table: Definition for the ayurvedic terminologies in Sanskrit

Ayurvedic terminologies	Meaning
Jatharagni	**Digestive fire responsible for digestion and metabolism of food**
Dhatwagni	**Part of Jatharagni residing in each Dhatu responsible for the body metabolism**
Dhatu(also called as Dushyas as it gets influenced in getting polluted easily)	**Seven in total that is responsible for the body framework and metabolism to survive in this world**
Dosha	**Three in number that are the foremost components for the body to function but also have the capacity to vitiate the Dhatu causing ailments**
Rasa	**The foremost Dhatu reason for the development of further Dhatu utpatti forms from the food consumed**
Rakta	**Blood and its components**
Mamsa	**Muscular tissues and its blood supply**
Medas	**Adipose tissues**
Asthi	**Skeletal system**
Majja	**Bone marrow**
Shukra	**The essence of all the six Dhatus which is responsible for the progeny development**
Ojas	**The utmost essence responsible for the person to survive – 2 types : Para & apara**
Nidana	**Causative factors**
Rooksha	**Rough in nature**
Teekshna	**Strong and pervasive**
Brmhana	**Nourishing to the body**
Medhya	**Brain tonic**
Rasayana	**Rejuvenating**