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Review Article

NEED-BASED *APATARPANA* (DEPLETING) AND *SANTARPANA* (NOURISHING) INTERVENTIONS IN MANAGING *PRAMEHA* WITH SPECIAL REFERENCE TO TYPE 2 DIABETES MELLITUS

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ABSTRACT

Prameha is a disease with different pathological conditions as per Ayurveda, comparable to Type 2 Diabetes mellitus. The main line of therapeutic intervention for *Prameha*, a disease due to over-nourishment, is *Apatarpana* (depleting regimens of Ayurveda to reduce the bulk of body tissues, particularly *Meda* and *Mamsa dhatu* in the present context). As a general principle of Ayurveda diagnosis, a disease is dynamic and changes its status and presentation with time, diet, and interventions. Complementing this, each therapeutic intervention is defined with deficit, optimum, and excess use features. Administering the intervention less than or beyond the requirement may harm the individual, resulting in hampered structure and/or function of other body components. In the present review, we have attempted to put forth this principle of need-based *Apatarpana* and *Santarpana* (bulk/strength promoting therapies of Ayurveda) interventions, in managing *Prameha* with special reference to Type 2 Diabetes Mellitus.

INTRODUCTION

Prameha is a disease with different pathological conditions as per Ayurveda in which, polyuria, glycosuria with hyperglycaemia, and other symptoms of Type 2 Diabetes mellitus (T2DM) can be seen as the presenting features. T2DM is a major non-communicable disease in recent times.[1] The prevalence in India has risen from 7.1% in 2009 to 8.9% in 2019. Its prevalence in India is estimated to be about 12% to 19% in urban areas and 4% to 9% in rural areas in different states of the country.[2]

Apatarpana (depleting regimens of Ayurveda to reduce the bulk of body tissues, particularly *Meda* and *Mamsa dhatu* in the present context) and *Santarpana* (the opposite of *Apatarpana*, to promote the bulk) are the two broad classifications of Ayurveda therapeutics and *Apatarpana* is considered the best approach for management in *Prameha*.[3]

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A literature review of the Ayurveda and contemporary textbooks as well as research publications was done to cover descriptions of different contexts of management principles of *Prameha, Apatarpana,* and *Santarpana* procedures with special reference to T2DM.

Prameha is considered a *Mahavyadhi*[4] (one among the group of serious diseases as per Ayurveda) involving *Basti Marma* (vital organ in the hypogastric region Genito-Urinary tract). The disease is caused due to *Santarpana* (nourishment surpassing the requirement as per energy expenditure and following a lifestyle having less energy expenditure over nourishment[5]) and hence called *Apathyanimittaja* (acquired) *Prameha*.[3] It is diagnosed by the symptoms including *Prabhuta Mutrata* (excessive urination–frequency and quantity) and *Avila Mutrata* (turbid urine).

Aggravated *Meda, Mamsa, Kleda,* and *Kapha* (the major pathological components in *Prameha* as per Ayurveda) in the body, due to over-nourishment, result in the manifestation of *Prameha*. So, the first line of treatment is considered as *Apatarpana*[3]. Once the optimum level is attained, it is advised to follow

Santarpana with due care to other influencing factors in the pathogenesis of the disease including the digestive capacity of the subject.[3]

Apatarpana includes *Samshodhana* (purificatory or detoxification therapy of Ayurveda) and *Samshamana* (palliative care of the disease). *Samshodhana* is indicated in excessively aggravated *Dosha (Vata* and/or *Pitta* and/or *Kapha),* for an individual who is fit to undergo such treatments. *Samshamana* is indicated in individuals otherwise.[3] The procedures of *Apatarpana* are comparable to a catabolic process that breaks down protein into amino acids, carbohydrates into glucose, and triglyceride molecules into glycerol and fatty acids.

Santarpana includes *Brumhana* (mass promoting), *Snehana* (promoting lubricating activity), and *Stambhana* (improving stability), comparable to the anabolic process that does Protein synthesis, Energy production as well as Lipid synthesis and storage.

Clinical Outcomes of *Apatarpana*

The process of a therapeutic intervention needs to be followed till attaining optimum results, which is termed *Samyak lakshana* (desired clinical outcomes).

The *Samyak lakshana* of *Apatarpana* are enlisted as follows:[6]

- Satisfactory evacuation of flatus, urine, and feces (*Vata Mutra Pureesha visarga*)
- Lightness of the body (*Gatra Laghava*)
- Feeling lightness and clearness in the chest region (*Hrudaya shuddhi*)
- Eructation without discomforts (*Udgara shuddhi*)
- Clarity in throat and mouth (*Kanta Aasya Shuddhi*)
- Decrease of drowsiness and exertion (*Gata - Tandra klama*)
- Appearance of appropriate sweat (*Jata Sweda*)
- Ability to appreciate the taste of food (*Jata ruchi*)
- The appearance of optimum hunger and thirst (*Kshut Pipasa sahodaya*).

The *Samyak lakshana* of *Santarpana* are enlisted as follows:[6]

- Improved stamina (*Bala*)
- Promotion of tissue mass (*Pushti*)
- Stability – physical and emotional (*Upalambha*)
- Reduced emaciation and its effects (*Karshya dosha vivarjana*)

There is an equal importance to the initiation of the appropriate intervention as well as withdrawing it, at the required stage of a disease, a unique characteristic principle of Ayurveda intervention. Thus, it is important to assess the *Samyak lakshana* of treatments. The importance of assessing the *Samyak Lakshana* of the *Apatarpana* in Prameha acts as an indicator to start *Santarpana*, to prevent the aggravation of *Vata dosha*, and to prevent the adverse effects of treatment.

An ideal therapeutic intervention (*Shuddha Chikitsa*) is that which addresses the disease without causing adverse effects on the status of other factors.[7] *Apatarpana* and *Santarpana* are the broad classifications of therapeutic intervention for any disease as per Ayurveda and both these are indicated or contra-indicated in specific conditions of the patient and the disease *(Arha* and *Anarha Lakshana).*

In the context of *Prameha* management, the status of the diseased individual and the extent of *Dosha* vitiation guides the indication or otherwise. Obese individual and/or with a greater extent of *Dosha* vitiation and/or who can tolerate is indicated for *Shodhana* intervention, whereas lean individual and/ or lesser extent of *Dosha* vitiation and/or who may not tolerate *Shodhana* is indicated for *Santarpana* intervention.[3]

Apatarpana, in general, if continued beyond the *Samyak Lakshana,* more than its requirement, would lead to symptoms like emaciation, giddiness, cough, excessive thirst, anorexia, decreased unctuousness (in tissues), decreased hunger and digestion, decreased sleep, impaired vision and hearing, decreased semen (quantity and/or quality), decreased *Ojas* (immunity), pain in hypogastric region, epigastric region, head, calves, thigh, hip, flanks regions, along with Fever, irrelevant and excessive talk, excess eructation, tiredness, vomiting, severe pain in the phalanges and bones as well as non-satisfactory/non-elimination of feces and urine.[8]

In the context of *Prameha* management, if the *Apatarpana* process is continued even after the attainment of its *Samyak lakshana*, can potentially produce complications, such as *Gulma* (palpable abdominal mass), *Kshaya* (tissue weakening), *Mehana-Basti shoola* (pain in phallus and urinary bladder) and *Mutragraha* (retention of urine). It might also lead to *Mutrakrucchra* (conditions leading to dysuria) and *Bhrama* (giddiness) (diseases/conditions named as per Ayurveda).[3]

Effects of excessive *Apatarpana* based on the *Rasa* (Taste) predominance in the drugs

The drugs having *Tikta rasa* (bitter), *Kashaya rasa* (astringent), and *Katu rasa* (pungent) act against the pathogenesis in *Prameha* in the form of *Apatarpana* and hence are commonly prescribed, such as *Syzigium cumini* L. (Blueberry, Jambu), *Momordica charantia* L. (bitter gourd, Karela) and *Cinnamomum verum* L. (Cinnamon Twak), which are also proven to have anti-diabetic effects.

Despite the indications, excess use of the drugs having Bitter taste leads to *Dhatukshaya* (weakening of the tissue components), *Balakshaya* (reduced stamina), fainting, generalized debility, giddiness, *Vataroga*

(Neuro-muscular, neuro-skeletal or neuro-degenerative disorders) and causes hardening, roughness, non-sliminess and dryness of the body.[9] An animal study conducted in mice to evaluate the effects and safety of *Momordica charantia* L. (Bitter gourd, Karavellaka) concluded that Administration of up to 4000mg/kg did not have any effect on the mice's kidney function and histology, however, chronic administration was nephrotoxic,[10] which would demonstrate the effects of excessive use of the drug.

Excess administration of the drugs with Astringent taste leads to *Shukra-uparodha* (obstruction to the functions of *Shukra*) [*Shukra*- Seminal tissue, which has two components, 1. *Garbhakara* component- responsible for reproduction and 2. *Sarvadaihika* component – responsible for the strong suit of the body overall[11]], excess thirst, distension of abdomen, stiffness, indigestion, emaciation, *Srotorodha* (obstruction to channels vaso/broncho, etc. constriction), constipation, non-satisfactory evacuation of flatus, oliguria, hemiplegia and seizure disorders.[12]

Excessive intake of drugs with Pungent taste leads to excess thirst, fainting, vomiting, delusion, debility, decrease of *Shukra*, dryness of throat, tremors, giddiness, increased body temperature (increased Basal Metabolic Rate – BMR), exhaustion, emaciation, burning sensation in the hands- feet- flanks and back, constricting pain, pricking pain, breaking pain and overall aggravation of *Vayu* (air element) and Agni (fire element).[12] Few studies have examined the adverse effects of *Cinnamomum verum* L. (Cinnamon, *Twak*), a drug with a pungent taste, including dyspepsia, allergic contact dermatitis, stomatitis, hepatitis, exacerbated rosacea, and peripheral edema.[13]

These symptoms may be seen in diabetic individuals who are on medications for a long time, in clinical practice, not found in research publications, and need further evaluation.

Management of *Prameha* and T2DM

The management of *Prameha* with special reference to diabetes mellitus (DM) is fruitful in the current trends of Ayurvedic clinical practice. The clinical approach for DM management in contemporary science is based on insulin resistance and/or insulin deficiency. T2DM includes insulin resistance and relative Insulin deficiency (increased demand for insulin owing to resistance, resulting in slowly progressive insulin deficiency, due to exhaustion of secreting pancreatic tissues), ultimately requiring insulin administration. This would also correlate to the conversion of all *Prameha* to *Madhumeha* (type of *Prameha* due to *Vata* predominance degeneration) in due course of time.

The class of oral hypoglycemic agents that act as insulin secretogogues may tend to hasten the process of progressive insulin deficiency, due to a decline in beta cell function in pancreatic islets of langerhans, which is an evident phenomenon in the pathology of T2DM.[14] This would suggest the *Atiyoga* of *Apatarpana* resulting in *Dhatu-Shoshana* (structural and/or functional tissue fragility beta cell dysfunction).

A variety of musculoskeletal disorders (MS) have been associated with DM. A cross-sectional study on subjects diagnosed with DM identified one or more MS disorders in more than 1/3rd of the sample size. MS disorders, predominantly osteoarthritis, hand disorders, and shoulder capsulitis were found to be frequent in this population, and the HbA1c level did not appear to be associated with the development of MS disorders.[15] More studies may help us understand if the continued and long-term usage of OHA is contributing to this observation.

The solution - Long-term care for *Prameha* in the form of *Santarpana*

After the elimination of vitiated *Doshas* by *Samshodana/Apatarpana* and when the *Samyak Lakshana* are noticed, the *Santarpana Chikitsa* is to be adopted to prevent *Apatarpana atiyoga*.[3]

Though the symptoms get alleviated, the persisting *Khavaigunya* (pathological state of tissue/s where *Dosha* causes the manifestation of the disease) would lead to the resurfacing of the disease due to any factor causing *Dosha* vitiation. Hence the *Khavaigunya* needs to be addressed with therapeutic modalities which are *Baddha-mutrakara* (acting against the pathology of polyuria), *Amedaskara* (not adding to the pathogenesis of dyslipidemia), *Abrumhana* (not increasing the bulk of the pathogenic tissues in the disease), *Agnideepana* (optimizing the functions of *Agni* metabolism) and *Balajanana* (promoting the strength of the diseased individual).[3]

The plan of intervention, considering the need for *Santarpana* after *Samyak yoga* of *Apatarpana*, needs to be devoid of contributory factors for the manifestation of *Prameha*, yet, be nourishing in nature. This challenge can be overcome with a few examples of therapeutic formulations. A few of the medicinal compounds with the desired properties for *Santarpana* in *Prameha* are tabulated in Tables No. 1, 2 and 3.

Table 1: Single herbs indicated in *Prameha* with Cytoprotective, Anti-oxidant, and Immunomodulatory properties

S.No.	Name of the drug	Properties and Action
1.	*Amalaki*[16] *Emblica officinalis* Gaertn.	*Pramehahara* Anti-inflammatory, anti-oxidant, immunoenhancer, immunomodulator[17], cytoprotective[18]
2.	*Guduchi*[16] *Tinospora cordifolia* (Willd.) Hook.f.	Anti-oxidant[19], immunomodulator[20]
3.	*Shatavari*[16] *Asparagus racemosus* Linn	Anti-oxidant[21], immunomodulator[22]
4.	*Arjuna*[16] *Terminalia arjuna (Roxb.) Wight & Arn.*	Anti-oxidant, hypocholesterolaemic[23]
5.	*Bala*[16] *Sida cordifolia* Linn.	Anti-oxidant[24], anti-diabetic[25]

Table 2: Medicinal compounds indicated in *Prameha* with *Rasayana*, Immunomodulatory effect

S.No.	Name of the drug	Properties and Action
1.	*Nishamalaki churna*[26]	*Medohara, Rasayana*[26], anti-diabetic, immunomodulatory, prevent neuropathy[27]
2.	*Chandraprabha vati*[28]	*Medohara* (anti-dyslipidemic), *Balya* (promote stamina), *Vrushya* (promote seminal health), anti-hyperglycemic, anti-diabetic[29]
3.	*Vasantakusumakara rasa*[28]	*Balya, Rasayana,* prevent diabetic neuropathy [30]

Table 3: Other Medicinal compounds indicated in *Prameha* attributed with *Rasayana* property

1.	*Ayaskriti* [26]	*Balya, Medohara*
2.	*Amalakasava*[26]	*Rasayana*
3.	*Kushavaleha*[28]	*Balya, Pushtikara* (nourishing)
4.	*Eladi Ghruta*[31]	*Rasayana, Medhya* (promote intellect), *Ayushya* (promote longevity)
5.	*Swarna vanga*[28]	*Medohara, Balya, Rasayana*
6.	*Bruhat vangeshwara rasa*[28]	*Balya, Rasayana*

Though few of the available evidences are at the base of the pyramid, these may pave the way for further stronger evidence.

It is also important to note that excessive *Santarpana* results in obesity and other conditions that can be due to over-nourishment including the increase of *Prameha*.

CONCLUSION

The management of a disease as per the clinical stage of the disease and the diseased individual is the core strength of Ayurveda intervention, especially, in the context of *Prameha* with special reference to T2DM. Understanding the contrast of *Santarpana* and *Apatarpana* therapies in light of biomedical research is a challenge. Few available publications on the long term safety and efficacy of certain herbs are encouraging to take up such works with background knowledge of Ayurveda principles. Each therapeutic intervention of Ayurveda has defined features and indications of optimum use. It is imperative to strike a balance of therapies as per the needs of the clinical and pathological stages. Administering any intervention beyond the requirement may prove to be harmful to the individual. The limitation of the review is that few of the available pieces of evidence are in the base strata of the pyramid and need further studies to evaluate the role of this dual therapy with special reference to T2DM.

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