Abstract-

Diabetes is a disease of global concern. With increased modernisation and materialism its incidence is increasing day by day. This might be because of the adaptation of more sedentary lifestyle by the people. Diabetes mellitus is a disease in which there is either complete lack of insulin or there is resistance to the action of insulin disturbing the metabolism of carbohydrate, fats and proteins. According to Aetiological factor, pathogenesis and clinical features Diabetes mellitus correlated with Madhumeha in Ayurveda. Madhumeha is a type of Vataja Prameha in which patient passes honey like sweet urine (Raised level of sugar in urine & Hyperglycemia). It is one of the Santarpanoththa Vyadhi. Guru, Snigdha, Pichhila Ahara, Pishtanna, excessive milk and milk products, lack of exercises are mentioned as the cause of Madhumeha. In today’s context
excessive intake of all the fast food like pizza, burger etc which are Guru as well as made of refined wheat flour (Pishtanna), Paneer, cheese (milk products), and sweets made of jaggery or other substances comes under the Aharaj Nidana of Prameha/Madhumeha. Similarly, sedentary lifestyle comes under the Viharaja Nidana. Modern science also recognises these factors as a cause of diabetes mellitus. Though Type 2 DM was earlier common in middle aged population but nowadays even a younger group of people are found to have Type 2 DM. Due to wide spectrum of disease, lack of effective medicine, need of time is to go for cost effective, safe and efficient treatment of Madhumeha. Keeping all above points in mind the Indra vati has been selected to know the effect in treating Madhumeha (Diabetes Mellitus). Indra vati consists of 4 main contents, which are Rasa sindoora, Vanga Bhasma, Arjun and Shalmali.

Keywords– Diabetes Mellitus, Madhumeha, Indra vati.

INTRODUCTION-

Diabetes Mellitus (DM) is one of the lifestyle related and non communicable diseases. As a psychosomatic disease and due to most dangerous complications, DM has grabbed the attention of health community all over the world. Diabetes mellitus (DM) is a clinical syndrome characterised by hyperglycaemia due to absolute or relative deficiency of insulin\(^1\). Several distinct types of Diabetes Mellitus are caused by a complex interaction of genetics and environmental factors. Factors contributing to hyperglycaemia include reduced insulin secretion, decreased glucose utilization and increase glucose production. Diabetes Mellitus can be classified into two broad categories: Type I DM and Type II DM. Type I DM is a result of absolute deficiency of insulin while Type II DM is a heterogeneous group of disorders characterised by variable insulin resistance, impaired insulin secretion and increased glucose production\(^2\). Diabetes Mellitus usually presents with symptoms like polyuria, polydypsia and polyphagia.

Prameha or Madhumeha is the disease described in the Ayurvedic literature that correlates to the modern day Diabetes mellitus. In Ayurveda ‘Madhumeha’ is considered as disease of vitiated Vata and Kapha dosha and Agnimandya is present in Madhumeha. Aacharya Charaka has used term “bahudrava shleshma tatha avabadha meda” in the description of Prameha and Dushyas involved in it are mainly Meda, Mamsa, Kleda, Shukra, Shonita, Vasa, Majja etc. are all Kapha Vargiya which indicates it is a multi system disorder. The prodromal features of Prameha are excess Mala in tooth, palate and tongue, burning sensation of hands and feet, oiliness in the body, excess thirst, sweet sensation in mouth according to Madhavnidan while additional features like sweetness in urine, foul breathe are mentioned in Sushruta Samhita. Similarly Aacharya Charaka has mentioned gathering of ants towards the site of urination as one of the prodromal features of Prameha. According to Sushruta a patient with all or half premonitory signs and slight or marked increase in urine output should be considered as a patient of Prameha. Many of these
features can also be seen in patient with diabetes mellitus in complicated or non-complicated stages. Since there are many similarities in etiology and manifestations of Madhumeha and diabetes, So we can correlate Madhumeha with diabetes mellitus.

WHO estimates that globally 422 million adults aged over 18 years were living with diabetes in 2014. The global prevalence of diabetes has grown from 4.7% in 1980 to 8.5% in 2014, during which time prevalence has increased or at best remained unchanged in every country. According to IDF Atlas 2017, 425 million over age 20-79 years are diabetics and 629 million individuals will have diabetes by the year 2045.

Though many studies have been carried out for this burning problem, still there is need of evaluation of certain drugs clinically on various scientific parameters which could be safe, effective, cheap & readily available in the management of Madhumeha.

Rationale/Justification:

Despite the immense investment in drugs and therapeutics for the management of Madhumeha, its prevalence is increasing at an alarming rate. Madhumeha does not come alone; it brings with itself the various metabolic complications of hyperglycaemia both acute and chronic affecting every organ from head to toe. Once an individual is diagnosed with Madhumeha the dosage of medicine is ever increasing and ultimately insulin has to be given for glycaemic control. As Madhumeha is often associated with obesity, dyslipidaemia, hypertension, insulin resistance, known as metabolic syndrome, an intervention capable of handling all these associated conditions is necessary.

In Ayurveda ‘Madhumeha’ is considered as disease of vitiated Vata and Kapha dosha and Dushyas involved in it are mainly meda, mamsa, kleda, shukra, shonita, vasa, majja etc. Agnimandya is present in Madhumeha. So ideally in Shamana chikitsa such drugs should be used in its treatment which possess Agni deepana properties and should pacify the effects of aggravated dosha like Katu, Tikta, Kashaya, Ruksha Dravyas.

The drug Indra vati is having mainly the above said properties. The ingredients of these drugs are easily available, easy to administer in patients and cost effective.

Aims and Objectives:

- To explore an Ayurvedic oral Hypoglycaemic Formulation, which is safe, economical, easily accessible to the patients and also devoid of side effects.

Materials and Methods:

- Ayurvedic textbooks were referred to collect the relevant materials.
- The index, non-index medical journals were referred to collect relevant information.

Symptoms of Hyperglycemia:

- Polydipsia (Thirst, dry mouth)
- Polyuria
- Hyperphagia, predilection for sweet foods
- Nocturia
- Tiredness, fatigue, lethargy
• Noticeable change in weight (usually weight loss)
• Blurring of vision
• Pruritus vulvae, balanitis (genital candidiasis)
• Nausea, headache
• Mood change, irritability, difficulty in concentrating, apathy

**Clinical Feature of Madhumeha (Diabetes Mellitus) by Ayurveda** -

• The clinical entity in which patient voids the urine having concordance with Madhu i.e. of Kashaya and Madhura taste, Ruksha (dry) texture and honey like colour and body acquires sweetness called Madhumeha⁵.
• In Madhumeha which is incurable and caused by the aggravation of Vata, the patient passes urine, sweet and astringent in taste, pale in colour and unctuous⁶.

**Pathogenesis (Samprapti)**-

*Samprapti* of ‘Madhumeha’ is best described by Acharya Vagbhata. Vagbhata has divided it into two types according to *Samprapti⁷.*

• A. Dhatukshayaja Madhumeha
• B. Aavaranjanya Madhumeha

In *Aavaranjanya /Santarpanajanya Madhumeha* due to excessive indulgence of Guru, Snigdha, Amla, Lavan Ahara, Kapha and Pitta are vitiitated. They block the natural pathway of Vata. Therefore aggravated Vata vitiates the Dushya like Kapha, Meda, Mamsa and the vital body components are excreted through urine. And Oja which is supreme part of all Dhatus is excreted ultimately.

In case of **Dhatukshayajanya/ Apatarpanajanya Madhumeha**, Vataprapakā Ahara-Vihara leads to aggravaation and vitiation of Vata. Therefore in this type Vata is becomes more harmful than the previous type. This aggravated Vata disturbs the normal metabolism of body and cause Kshaya of all vital Dhatus. In both these types Apara oja is excreted through urine. The first type of Madhumeha is considered to be Asadhya and no precise remedy has been suggested for it. But the later type has been told as Krichhra Sadhya and can managed with extensive treatment.

Besides this, one more process i.e. **Dhatvagnimandya** is important part of the *Samprapti*. As, in Prameha Agni is also disturbed due to various factors which disturb the balance of *Tridosha*. Therefore anything which is ingested is converted in Ama. So, the process of Dhatuposhana and Dhatu-upatti is hampered. Again this Agnimandya is responsible for the Dhatvagnimandya of each Dhatu. In Prameha, especially Medodhatvagnimandya is observed. Therefore the treatment should be in path of restoration of Agni in its normal state and having Kaphamedohara property. It should also possess Rasayana and Balya effect as all Dhatus are involved and Ojakshaya is seen in the disease. Also in the Madhumeha (Diabetes Mellitus) there are degenerative changes in the body especially in the islets cells of pancreas which resembles Dhatu Kshaya in Ayurveda.

As per Ayurveda according to the potency of particular feature of etiology, Dosha (innate pathogenic factors) and Dushyas (substratum of pathology), response occurs in the form of
non-manifestation or otherwise of the disorders. When these three factors do not combine together or if combined after a long time or in weakened state, disorder will not be there, or it will manifest lately, or in a mild form or without all the said symptoms.

**Drug Review:**

Selection of drug is milestone in any research project because success of the project is totally depends on that. In Ayurveda, the action of drugs is determined on the basis of pharmacodynamics properties such as *rasa*, *guna*, *veerya* and *vipaka* along with certain unexplained specific properties called *Prabhava* (*karma*). These drugs in combination act as antagonist to the main morbid factors i.e. aggravated *dosha* and *dushya* to cause *Samprapti Vighatana* so as to allay the symptoms of the disease.

**Indra Vati** (*Rasendra saar sangrah Prameha 2-3*):

मृतं सूतं मृतं वद्ग्रहरुनस्य त्वचान्न्वित्तम ।
तुल्यांशं मद्येतू स्वल्पेषा शालमल्या मूलजैहवः ॥
विनाघने वदिका कार्यामाषमत्रा प्रमेहहः ।
एषा इत्यवती नामसा सधुमेहप्रशालित।

**Table No. 1. Contents of Indra vati**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Constituents</th>
<th>Botanical Name/ Chemical Name</th>
<th>Parts Used</th>
<th>Quantity</th>
<th>Rasa</th>
<th>Guna</th>
<th>Veerya</th>
<th>Vipaka</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Rasa Sindoor</td>
<td>Red sulphide of mercury</td>
<td>bhasma</td>
<td>1 Part</td>
<td>Katu, Tikta</td>
<td>Laghu, Ushna, Tikshna</td>
<td>Ushna</td>
<td>Katu</td>
</tr>
<tr>
<td>2.</td>
<td>Vanga bhasma</td>
<td>Stannum</td>
<td>bhasma</td>
<td>1 Part</td>
<td>Tikta, Kashaya</td>
<td>Laghu, Sara, Ruksha</td>
<td>Sheeta</td>
<td>Madhura</td>
</tr>
<tr>
<td>3.</td>
<td>Arjuna</td>
<td>Terminalia Arjuna Bark</td>
<td></td>
<td>1 Part</td>
<td>Kashaya</td>
<td>Laghu, Ruksha</td>
<td>Sheeta</td>
<td>Katu</td>
</tr>
<tr>
<td>4.</td>
<td>Shalmali</td>
<td>Salmalia Malabarica Root</td>
<td></td>
<td>As per requirement</td>
<td>Kashaya, Madhura</td>
<td>Guru, Grahi, Sheetal</td>
<td>Sheeta</td>
<td>Madhura</td>
</tr>
</tbody>
</table>

**Methods of Preparation:**
All ingredients of Indra Vati should be taken as above mentioned ratio (Rasendra saara samgraha Prameha 2-3) and should be prepared as per the Sharangadhara Vati Kalpana.

**Probable Mode of Action of Indra vati:**

Indra vati are as total four drugs, majority of contents having Tikta, Kashaya and Katu rasa, Laghu, Ruksha Guna. Out of them three have Sheeta veerya and one drug has Ushna veerya. Two durgs have Katu Vipaka, and two drugs have Madhura Vipaka.

Madhumeha is dhatvagnimandyaajanya disorder and abadha meda is the main dushya, dravit shleshma is main dosha.

- So Tikta and Katu rasa predominant drugs will act on the Aam and will help to improve dhatvagnimandya. While Kashaya ras drugs acts on the dravtva guna of shleshma and Abadhatva guna of meda, due to Kashaya ras, dravtva and Abadhatva will be reduced.
- Ushna veerya drugs helps to improve dhatvagnimandya while Sheet veerya drugs help to reduced dravtva and sarnatvata of shleshma and meda.
- Ruksha and lagu guna are help to Absorb or control the dravtva guna of shleshma.
- The Rasayana effect of some drugs (Rasasindoor and Vanga bhasma) in Indra vati helps in restoration of Oja. Even animal research works have shown the hypoglycemic effect of these constituents. So we can say that Indra vati can be useful in the management of diabetes mellitus.

Individual components of this compound Rasasindoor, Vanga bhasma, Arjuna twak churna, and Shalmali moola swarasa have Madhumehaguna properties as in Ayurvedic literature (Yogratnakar, Rasendra sara samgraha, Charak samhita chikitsa sthana).

- Rasasindoor is yogavahi, balya, vrishya, rasayan in property, Ushna inVeerya and Katu in Vipak. It is Kaphaghna in dosha karmata so it may be beneficial in controlling Madhumeha.
- Vanga bhasma is tikta kashay in rasa, laghu, sara, ruksha in nature, Sheeta veerya, madhura in Vipak. It has the properties like chakshuya, balya and vrishya, vatahara and sarvameha nashan activity. Vanga bhasma is already proved as an anti diabetic agent8,9,10.

- Arjuna twak churna is kashaya in rasa, laghu and ruksha in guna, sheeta in veerya and katu in vipak. It has Kapha pitta shamak activity, sthambhak and varna ropan properties. May be by its sthambhak property it controls the prabhuta avila mutrata or frequent urination. May be the vranoropan property helps in diabetic wound healing, which is the complications of diabetes.

- Bhavaprakash has attributed the medohar property to arjuna and arjuna is one of the constituent it might have also contributed in controlling the lipid profile thereby lipid metabolism. Thus controlling the lipid metabolism the drug as whole might have prevented the neoglucogenesis and thus regulated the diabeticis.

- The bhavna drug shalmali moola swarasa, which is kashaya madhura in
rasa, guru, grahi and sheetal in guna, sheeta veerya and madhura in vipak. It has stambhan and grahi properties and Vata Pitta shamak in nature. As Madhumeha itself is a vataja meha, may be beneficial in Madhumeha.

**Conclusion:**

Diabetes Mellitus is a common chronic metabolic disease associated with substantial risk for morbidity and premature mortality. Medical therapy is just a part of the diabetes management and not a whole treatment. There are so many drugs available in modern medical science for the treatment of Diabetes Mellitus (Madhumeha) but they are
associated with adverse effects but Ayurvedic principles of management can help the patient to have better control of blood sugar with no adverse effects and makes free the dependency on medicine. So, *Indra vati* mentioned in *Rasendra saar sangrah* could play this role and can show its hypoglycemic effect. It is composed of *Rasa sindoora*, *Vanga Bhasma*, *Arjun* and *Shalmali*. Further, various researches have already been conducted in favour of their hypoglycemic effect. So we can use this medicine for the treatment of *Madhumeha* (Diabetes mellitus).

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