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Research Article

AN EPIDEMIOLOGICAL STUDY ON *PRAMEHA* (DIABETES MELLITUS) IN KOLKATA

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ABSTRACT

Type 2 diabetes mellitus is one of the most leading causes of death and disability worldwide among the lifestyle disorders where dietary and lifestyle factors play a major role. *Prameha* is a classical metabolic disorder of tissue and cellular level. Unhealthy diet and physical inactivity are the leading causes of the lifestyle disorders; *Prameha* is also among them as mentioned by *Acharya Charaka*. A survey study was carried out to study the prevalence of *Prameha* patients and associated risk factors in the light of epidemiological aspect. 120 diabetic patients from OPD of Institute of Post Graduate Ayurvedic Education and Research, Kolkata, were selected randomly according to their registered address as residents of Kolkata. A survey proforma along with consent form was prepared and detailed history of each patient fulfilling the subjective criteria of *Prameha* and objective criteria of Diabetes Mellitus were taken. On considering data of *Santarpana nidana*, maximum patients were taking excess carbohydrate (90%); dairy products (82.5%); fried and fatty diet (68.33%); sweets and sugarcane preparations (79.16%); junk and fast foods (82.5%) in excessive quantity and 51.66% patient were found to be with increased BMI. Factors observed related to lifestyle are *Divaswapna* (60%) and *Asyasukham* (65%). *Udvega* (stress) were found in 88.33% of patients. This study revealed that prevalence of carbohydrate rich diet; dairy products; junk food and increased BMI are found dominant in diabetes patients in Kolkata. Avoidance of these faulty dietary habits and sedentary lifestyle, further progression of the diabetes along with its complications can be inhibited.

KEYWORDS: Diabetes mellitus, *Prameha nidana*, Epidemiological study, BMI.

INTRODUCTION

There is increased frequency of micturition and increased urinary output in this disease. Therefore it is called *Prameha (Prakarshena mehati eti prameha/ Prabhuta avila mutrata)*[1]. In Ayurveda, there are 20 types of *Prameha*- 4 types of *Vata*, 6 types of *Pitta* and 10 types of *Kapha*[2].

The Diabetes Mellitus has been generally classified into type-1 and type-2[3]. The type-I Diabetes Mellitus is more rapidly to *Dhatuapakarshana janya Prameha* while the type-II Diabetes Mellitus resembles to *Avaranajanya Prameha*. In the pathogenesis of *Avaranajanya Prameha*, *Kapha* and *Pitta* are the common *Dosha*, while the most essential *Dushyas* are *Meda* and *Kleda*.

Acharya Charaka clearly mentioned about *Samanya nidanas* of *Prameha* in *Charaka Chikitsa sthana* 6th chapter which are "*Ashyasukham swapnasukham dadhini gramyodaka anuprasah payansi, navannapanam guda vaikrutam cha prameha*

hetu kaphakruchha sarvam"[4]. But in *Nidana sthana* 4th chapter, specific *Nidana* for each category of *Prameha* are mentioned. In modern science lifestyle factors (sedentary life) and genetic factors are the primary causes of Diabetes Mellitus. Diabetes is a group of metabolic diseases, characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. Diabetes Mellitus is a major health problem for the world in the 21st century. Globally, at least 50% of all people with Diabetes are undiagnosed and due to this Diabetes a persons risk of death become double. Prevalence of Diabetes Mellitus throughout the world has been reported- 8.5% as per report of 2014, which is in India- 7% adults with higher prevalence of males (7.1%) than females (6.8%). We can observe its prevalence in urban life (9.8%) than rural residents (5.7%)[5]. W.H.O projects that Diabetes will be the 7th leading cause of death in 2030.

According to Ayurveda, *Prameha* is a classical metabolic disorder of tissue at cellular level. In Ayurveda, this condition may correlate with *Dhatvagnimandya*. Since Vedic period *Prameha* is a disease known to mankind and it is classified into twenty types by almost all *Acharyas*. It is a disease in which patient passes the urine having turbidity as '*Prabhutaavilamutrata*'[6]. It is also explained that, when the *Kaphaja* and *Pittaja Prameha* are left untreated, this lead to the condition called *Vataja Prameha* where *Ojakshaya* occurs[7]. So, to prevent the advance condition of *Prameha* we have to cure and inhibit the production of *Bahuabaddha meda* and *Bahudrava sleshma* which are the major *Dushyas*[8] of *Prameha* produced from *Agnidusti*. Etiological factors create *Agnimandya* which leads to formation of *Vidagdha Kapha* and *Ama* which is *Kledakara*. Again this *Agnimandya* is responsible for the *Dhatvagnimandya* of each *Dhatu*. Due to this, *Apakva Dhatu* is formed, which leads to *Dhatushaithilya* and *Kledavriddhi*. Simultaneously these *Nidana* causes *Kha-Vaigunya* in *Medovaha Srotasa* and vitiates *Medo Dhatu* which is *Bahuabaddha*. As a result, this increased *Kledavridhhi* manifest as *Prabhutavilmutrata* (polyuria).

Now-a-days, the era of urbanisation has produced increased number of fast food and frozen-canned foods which are easily available in market in all seasons. The food habit and lifestyle have also been modified according to the profession of an individual. Hence much importance for taste is given but not for health benefits. *Acharya Sushruta* mentioned that avoidance of *Nidana* or causative factors is treatment[9]. Today, in this present era, people are neglecting the causative factors for the diseases and rushing in the direction of treatment methodologies. It's the need of the hour to concentrate on the concept of *Nidana Parivarjana Chikitsa* i.e., towards avoidance of causative factors. In every disease, this is prime theory to be followed. On this, *Acharya Chakrapaṇi* commented that avoidance of etiological factors in *Prameha* is very important and it should be controlled to prevent further progress of disease[10]. Only *Nidana Parivarjana* is not enough but along with this proper diet management is essential.

The present study was done to reveal the epidemiological data regarding age, sex, religion, occupation, dietary habits, socio-economic status and family history along with *Aharaja* and *Viharaja nidana* in usual modern and current perspectives. The survey was done to draw an epidemiological picture about the etiology and risk factors for a particular population of a region, to find out cause and effect relationship between diet and life style and *Prameha* and also to promote self consciousness among the people of this area.

MATERIAL AND METHODS

A cross-sectional survey study was carried out to study the prevalence of *Nidana* in *Prameha* patients and associated risk factors in the light of present scenarios. Total 120 patients of *Prameha* (Diabetes Mellitus) fulfilling the diagnostic criteria of American Diabetes Association (ADA) 2016, were rand only selected irrespective of age, sex, religion, occupation and socio-economic conditions from OPD of hospital, Institute of Post Graduate Ayurvedic Education and Research at Shyamadas Vaidya Shastra Peeth Hospital, Kolkata. Survey was based on a specially prepared questionnaire mentioned in proforma, BMI, laboratory parameters and *Nidanatmaka* criteria of Ayurveda. This is an epidemiological cross-sectional survey study and study was in accordance with STROBE guidelines. The informed consent from each patient was taken. Ethical clearance for the study has been obtained from Institutional ethical committee of Institute Of Post Graduate Ayurvedic Education and Research at Shyamadas Vaidya Shastra Peeth Hospital, Kolkata, (SVP/558/2017 dated on 29.05.2017).

The diagnostic criteria of American Diabetes Association (ADA) 2016 for Diabetes Mellitus are given below. [11]

- FPG ≥ 126mg/dL (7.0mmol/L)
- PPBS ≥ 200mg/dL (11.1mmol/L)
- HbA1c ≥ 6.5% (48mmol/mol)

RESULTS AND OBSERVATIONS

In Survey study out of 120 patients, maximum patients (46.66%) were found in the age group of 41-50 years. 55% patients were male. Maximum patients (52.5%) were taking mix type of diet. Regarding family history, 58.33% patients had positive family history of type 2 diabetes mellitus. Among them, 56.66% was from Islamic religion. On the basis of occupation, 51.66% patients were businessman. 62.5% patients were from mid socio-economic status.

On considering the data of *Sharir Prakriti* (body constitution), maximum i.e. 56.66% patients had *Vata-Kapha Prakriti.* 51.66% patients were having BMI 25-30kg/m² which indicate obesity. Analyzing the *Agnidusti,* it was found that, 60% patients were having *Vishamagni.* 58.33% patients had *Madhyam Kostha.*

Out of total 120 patients, 65% were having sedentary nature of work (*Asyasukham*). 60% patients had a habit of excess sleeping (*Svapnasukham*) especially during day time (*Divasvapna*). Maximum patients (66.66%) were

consuming more amount of *Madhura Rasa* (sweet foods) followed by *Lavana* and *Amla Rasa*. Excessive stress *(Udvega)* and grief (*Shoka*) were found in 88.33% and 20% patients respectively.

Data on *Aharaja nidana* are also collected in the light of usual foods taken by the community. Maximum patients were taking excess carbohydrate (90%) such as boiled rice, fragrant rice like basmati, govinda bhog etc., maida, tubers like potato, carrot, elephant foot yam, radish etc., bread etc., even they didn't take green-leafy vegetables regularly in their diet. 82.5% patients used to take dairy products regularly like- *Payes* (An Indian dessert consisting of rice and sugar boiled in milk), milk, paneer etc. 68.33% patients took fried and fatty diet (oil, ghee, cheese in excess) regularly; sweets and sugarcane preparations like- sugar, sugarcane juice, sweets like-rasogolla, sandesh etc. were taken by 79.16% of patients habitually. Cold drinks, papdi chat, noodles, pattice, pizza, burger, frozen and canned foods etc. were taken by 82.5% patients (junk and fast foods) in excessive quantity.

Table 1: Shows general study on general data of risk factors of *Prameha* (N=120)

S. no.	Criteria	No. of patients	Prevalent percentage (%)
1	Age (41-50 yrs)	56	46.66
2	Gender (male)	66	55
3	Dietary habit (mix diet)	63	52.5
4	Family history of DM	70	58.33
5	Religion (Islam)	68	56.66
6	Occupation (Businessman)	62	51.66
7	Socio-economic status (Middle)	75	62.5

Table 2: Shows *Prakriti-agni-kostha* and BMI of the patients of *Prameha* (N=120)

S. no.	Criteria	No. of patients	Prevalent percentage (%)
1	*Vata-kapha prakriti*	68	56.66
2	*Vishamagni*	72	60
3	*Madhyam kostha*	70	58.33
4	BMI (25-30kg/m^2)	62	51.66

Table 3: Shows *Aharaja and Viharaja nidana* in Ayurved parlance of the patients of *Prameha* (N=120)

S. no.	Criteria	No. of patients	Prevalent percentage (%)
1	*Asyasukham*	78	65
2	*Svapnasukham*	72	60
3	*Madhura, Lavana* and *Amla Rasa*	80	66.66
4	*Udvega*	106	88.33
5	*Shoka*	24	20

Table 4: Shows *Aharaja and Viharaja nidana* in modern parlance (N=120)

S. no.	Criteria	No. of patients	Prevalent percentage (%)
1	Carbohydrate rich diet	108	90
2	Dairy products	99	82.5
3	Fried and fatty diet	82	68.33
4	Sweet and sugarcane preparations	95	79.16
5	Junk and fast foods	99	82.5

DISCUSSION

For type 2 diabetes, Age is a significant risk factor. It is principally a disease of the middle-aged or an elderly. In this survey study, Maximum patients belong to the age group of 41-50 years, this reveals that maximum prevalence of the disease at *Madhyavastha* (middle age). The middle aged persons used to lead a hard schedule of life. Hence they are exposed to the major *Nidana* of *Prameha*. This is the

probable cause of this type of data reflexion. Maximum patients were males in this study. Modern studies show that males have comparatively high prevalence rather than females. In Ayurveda, *Dalhana* in his commentary remarks that females also suffer from *Prameha*. The present study have shown that maximum patients took mix diet i.e. veg. and non-veg. both used to be present in their diet. Regarding family history, more than half of patients had positive history of type 2 diabetes in family. It indicates that, *Prameha* have relation with *Bija dosha* and described as *Anushangi Vyadhi*[12] i.e. it runs in the families. Study shows the percentage of patients of Islam religion more than others; it suspects that surrounding population may be the probable cause of this type of reflexion. Maximum patients were occupationally businessman which also makes clear the particular *Nidana* of *Prameha.* Observation of socio-economic status shows that maximum patients belong from middle class. Now a day, in modern civilization, people consume unhealthy dietary articles like junk food and sedentary lifestyle frequently and this happens especially in urban areas rather than rural. But these conditions afflict the *Srota* (body channels) and like this way *Kha-vaigunya* takes place. For the further progress of disease it needs particular *Nidana*s (etiology) and by this way *Bahuabaddha meda* and *Bahudrava sleshma* becomes manifested to produce *Prameha*[13].

Majority of patient were belonging to *Vata-Kapha Prakriti.* So, it can be said that person having *Kapha* dominant *Prakriti* are more prone to be diabetic as mentioned in classics that *Prameha* is a *Kapha Pradhana tridoshaja vyadhi*[14]. On analyzing the *Agni* (digestive fire), majority of patient was having *Vishamagni* (imbalanced appetite) which signifies the imbalanced state of *Agni.* Any kind of *Agnidusti* can manifest any disease; likewise *Vishamagni* also can aggravate *Dosha* and hamper *Dhatvagnipaka* which ultimately produce *Medadusti* and thus manifest *Prameha*. Maximum patients were having *Madhyam Kostha*. It suggests dominance of *Kapha Dosha* in their body. Regarding BMI, maximum patients had BMI 25-30kg/m², and likely therefore being most contributing risk factor for diabetes. According to international classification of BMI as per WHO Expert Consultation for Asian population[15], this BMI range indicates obesity which is one important cause of insulin resistance. High BMI is a strong risk factor for Diabetes like *Medadusti* in *Prameha.* Acharya Charaka has used term *Bahuabaddha Meda* (circulating fat) and also emphasized on *Meda dhatu vriddhi* and *Medodhatvagnimandya.*

On the other hand, based on data of *Aharaja Nidana* (Dietary Factors), most of the patients were having indulgence with boiled rice, fragrant rice, potatoes, cake-biscuits etc, rich carbohydrate diet. Sweet fruits, milk and its preparations can increase glucose in blood promptly. Cold drinks, *Dadhi* (curd), *Ikshuvikara* (jaggery and its preparations), *Madhura Rasa* (sweet taste) and *Lavana Rasa* (salty taste), *Dravannapana* (liquid diet), *Guru* and *Snigdha Ahara* (heavy and unctuous diet), fast foods etc in excessive quantity can vitiate *Kapha* and *Meda* simultaneously for their similar qualities. *Madhura Rasa* is dominant etiological factor for generation of *Agnidusti* (faulty digestive fire), which is the root cause of every disease[16]. *Agni* is responsible for bio-transformation of different food materials by digestion, absorption, metabolism and assimilation. So, vitiation of *Jatharagni* (digestive fire) leads to vitiation of *Dhatvagni* and *Bhutagni* also. *Lavana Rasa* is responsible for *Kapha prakopa* and production of *Kleda.* Oily, spicy junk foods produce *Ama* inside the body and produces *Medadusti. Ama, kapha* and *meda* –these have *Guru Guna* that raises bad cholesterol (LDL) and promoting inflammation throughout the body. Excessive use of *Dadhi* causes *Srotorodha* (blockage of channels) due to its *Abhishyandi* nature[17]. *Ikshuvikara* when consumed too much, raises blood glucose levels but due to *Abhishyandi*, insulin does not act on raised blood sugar.

The present study also reveals that in *Viharaja Nidana*, maximum patients were having habit of *Aasyasukha*, *Svapnasukham*[18], and *Divasvapna*. Again all these lifestyle factors increase quantity of *Bahuabaddha meda* and *Bahudrava sleshma* in the body. Regarding psychological factors, *Udvega* (stress) were dominant in many patient along with *Shoka* (grief), *Mano-Aghata* (psychological factors) is the cause of *Agnidusti* which is also mentioned by *Acharya Charaka*[19], as the wholesome food taken even in proper quantity does not get properly digested when the individual is afflicted with grief, fear, anger, sorrow and excessive sleep.

It is clear that psychological factors like stress, anger, anxiety etc. may play a major role in the etiology of *Apathya Nimittaja Prameha* (type 2 DM). The high prevalence of diabetes observed in urbanized societies of metro city, has been attributed to psychological stress especially due to their occupation. Disturbed psychological factors affect the blood sugar in many ways like it increases glucagon secretion, inhibits insulin secretion as well reduces insulin utilization in the body[20], which are the main reasons in type 2 Diabetes mellitus raising the blood sugar level.

From the above discussion, we can say that the correction of various *Agni* in *Prameha* may be considered as a part of treatment. In *Prameha,* carbohydrate and fat metabolism is impaired. Again due to lack of insulin or due to defect in function of liver glucose is not converted in glycogen and it retains in the body. All these unmetabolised products can be called as *Ama*[21]. Insulin which is secreted by beta cells of pancreas, works as key factor for the entry of glucose at the cellular level. Thus the function of insulin is similar to the function of *Dhatvagni*. So, absolute or relative insulin deficiency can be correlated to *Dhatvagnimandya.*

CONCLUSION

This cross-sectional study revealed that prevalence of carbohydrate rich diet, fried and fatty diet, excess dairy products, junk or fast foods and increased BMI are found dominant in diabetes patients. Excessive consumption of these faulty dietary habits, faulty lifestyle and chronic stress play a major and significant role in the manifestation of the disease with disturbance in blood glucose and lipid profile. If people avoid these faulty dietary habits and sedentary lifestyle then development of diabetes will be controlled due to inhibition of the pathway of production of *Bahuabaddha meda* and *Bahudrava sleshma*. It is documented that, up to 80% of type 2 Diabetes is preventable by adopting a healthy diet and increasing physical activity. So, exploration of *Nidana,* it will be the contribution to make social awareness about risk factors of diabetes and to control the progression of the disease.

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