Research Article

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A CROSS SECTIONAL SURVEY TO ANALYSE THE DEHA PRAKRUTI AND THE MAJOR RISK FACTORS OF TYPE 2 DIABETES MELLITUS

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ABSTRACT

Prakruti (natural constitution) is the expression of one's own constitution. It is the foremost factor which determines the pattern of susceptibility of an individual to different diseases, their prognosis, course and complications. Diabetes has reached an epidemic proportion in many developing countries. Primary prevention generally focus on high risk individual from a population. The survey was conducted with the aims and objectives of finding out that Prakruti which is at risk of type 2 Diabetes mellitus and to see the relation between etiological factors of type 2 Diabetes mellitus and Prakruti and to rule out the basic principle working behind it. In the study, 100 patients of type 2 Diabetes Mellitus were selected and from OPD and IPD of SDM College of Ayurveda and hospital, Hassan. Written consent was taken from all the patients and structured interview was conducted. After the statistical analysis, it was found that all Prakruti persons are having chance to get type 2 Diabetes Mellitus, among them Kapha Pradhana Prakruti was found to be prone to type 2 Diabetes Mellitus. Genetic predisposition, faulty diet, sedentary life style and psychological impact have got a significant relation with the manifestation of type 2 Diabetes mellitus irrespective of Prakruti.

Key words: Family history, Prakriti, Sedentary lifestyle, Type 2 Diabetes Mellitus

INTRODUCTION

The concept of Prakruti is an unique contribution of Ayurveda. Prakruti is the constitution of an individual which is decided by predominance of Dosha (humor) at the time of union of Shukra (sperm) and Shonita (ovum).[1] Depending upon the predominance of Dosha, seven different types of Prakruti have been mentioned.[2, 3, 4] Three Ekadoshaja (predominance of one humor), three Dwandwaja (predominance of two humor) and one Sannipataja (predominance of three humors). Further while explaining Diabetes Mellitus, it is a syndrome of chronic hyper glycaemia due to relative insulin deficiency, resistance or both.[5]Type 2 Diabetes Mellitus is one among the types of Diabetes Mellitus and in this, patient retain the capacity to produce lower amount of insulin but exhibit impaired sensitivity to insulin.[6]Overweight, obesity and lack of physical activity are the most common causes of this form of Diabetes. India is facing a big challenge posed by the rising prevalence of Diabetes and its complications. There is an urgent need to implement primary and secondary prevention in diabetes.[7]Primary prevention refers to action taken prior to the onset of disease and secondary prevention consists of the action which stops progression of disease at initial stage and prevents complication.[8]Primary prevention generally focus on high risk individual from a population. In this study it is an attempt to find out the Prakruti which is at risk of type 2 Diabetes mellitus and to see the relation between etiological factors of type 2 Diabetes mellitus and Prakruti and to rule out the basic principle working behind it.

MATERIAL AND METHODS

Method of collection of data

100 diagnosed patients of type 2 Diabetes Mellitus of 30-60 years were selected from the OPD and IPD of SDM Ayurveda Hospital Hassan, by considering their subjective and objective criteria. Written consent was taken from all the subjects and structured interview was conducted. For the assessment of Prakruti, Validated questionnaire – Protocol Prakruti analysis tool (Dr. Sanjeev Rastogi) was used.[9]Self structured questionnaire was used to assess the etiological factors of type 2 Diabetes Mellitus, taking references from both Ayurvedic and modern perspective. IEC No: SDMCAH/IEC/4/13-14

Criteria for selection
a) Inclusion criteria
- Patients of either gender of age group 30 – 60.
- Diagnosed case of Type 2 Diabetes Mellitus with history upto 3 years.

b) Exclusion criteria
- Pregnant subjects.
- Type 2 Diabetes Mellitus associated with complications such as Diabetic Retinopathy, Diabetic Nephropathy, Myocardial infarction etc.
- Those who are subjected to insulin.

c) Subjective criteria
- Increased frequency of micturition.
- Increased hunger and thirst.
- Tiredness.

d) Objective criteria

FBS report of the patients at their visit was taken into consideration.

Statistical analysis

The data was entered into software Statistical Package for Social Sciences version 16 (SPSS Inc. Chicago, IL, USA). The results were obtained on performing 'Pearsons –chi-square test for association and also by running frequency test. Phi value was taken into consideration to analyze the strength of association.

OBSERVATIONS AND RESULTS

The survey study carried out in the present series of patients revealed that maximum incidences were found in between 51 – 60 years of age, female gender, Hindu religion, household job workers, and vegetarian dietary habit. Maximum number of patients were having duration of illness of two to three years.60 % were having increased micturition, 54% with increased thirst and hunger and 55% with tiredness.

Prakruti

By considering the percentage of the dominated Dosha, Prakriti was assessed and all the subjects were of Dwandwaja Prakriti. Based on the dominated Dosha, six Dwandwaja Prakriti was considered in the study, in which Vatapitta and Pittavata Prakriti was not observed in the study. Among the 100 samples, 48% were of Kaphavata Prakruti, followed by 35% of Kaphapitta Prakruti.

Data related to etiological factors of type 2 diabetes mellitus

Family history

Family history was positively appreciated in 62% of total samples, but while considering the Prakruti following result was obtained.

Table 1: Association between family history and Prakruti

Prakruti		Observed N	Expected N	Df	P Value
Pittakapha	no	0			
	yes	2	2.0	-	-
	Total	2			
Vatakapha	no	4	7.5		
	yes	11	7.5	1	.071
	Total	15			
Kaphapitta	no	12	17.5		
	yes	23	17.5	1	.063
	Total	35			
Kaphavata	no	22	24.0		
	yes	26	24.0	1	.564
	Total	48			

Even though 11 of Vatakapha Prakruti (n=15), 23 of Kaphapitta Prakruti (n=35) and 26 of Kaphavata Prakruti (n=48), were having positive family history, relation between these two were observed to be non-significant.

Diet

Under diet, following were found significant, milk in Kaphapitta Prakruti (P = .028), curd in Vatakapha Prakruti (P = .005) Kaphapitta Prakruti (P =.000) and Kaphavata Prakruti (P = .000), sugar in Vatakapha Prakruti (P=.001), Kaphapitta Prakruti (P=.000) and Kaphavata Prakruti (P = .000), coffee in Kaphavata Prakruti (P=.021), snacks in Vatakapha Prakruti (P = .020), skipping of meals in Kaphavata Prakruti (P = .043) .All these variables were computed to a single variable as Diet and its relation with Prakruti was assessed by Chi – square test and association was analyzed. Diet was found significant in Kaphavata Prakruti and was non-significant in all the other three Prakruti.

Table 2: Association between diet and Prakruti

Prakruti		Diet
Pittakapha	Chi-Square	.000[a]
	Df	1
	Asymp. Sig.	1.000
Vatakapha	Chi-Square	1.533[b]
	Df	7
	Asymp. Sig.	.981
Kaphapitta	Chi-Square	15.143[c]
	Df	8
	Asymp. Sig.	.056
Kaphavata	Chi-Square	17.000[d]
	Df	7
	Asymp. Sig.	.017

Life style

As sedentary life style has an important role in causing type 2 Diabetes Mellitus, the life style of every patient was assessed by calculating their Physical Activity level.

Physical activity level for each physical activity: [10]

"= MET-1*[(1.15/.9)*duration in minutes /1440)/**BEE**/).0175 *1440*Weight"

Metabolic Equivalent of Task (MET)
MET is used as a means of expressing the intensity and energy expenditure of activities in a way comparable among persons of different weight.

Table 3: Physical activity and their respective MET SCORE

Physical Activity	MET SCORE
House hold task	3.5
Sitting	1.5
Walking	3
Watering plants	2.5
Mopping	3.5
Lying quietly	1

BEE = Basal energy expenditure
It reflects the basic metabolic rate or the daily energy needed to sustain cell metabolism and associated life processes to a 24 hour period. For male and female there is separate formula to asses BEE.
Male= BEE=293-3.8*Age in years+456.4*height in metres+10.12*weight in kg
Female= BEE=247-2.67*Age in years+401.5*height in metres+8.6*weight in kg

Primary activity level = 1.1+sum of each PAL

Table 4: Primary activity level

Primary Activity level	Life style
1 – 1.4	Sedentary
1.4 – 1.6	Less active
1.6 – 1.9	Active
1.9 – 2.7	Very active

Sedentary life style was found significant with Kaphavata Prakruti with P Value = .000 and was found non-significant in Pittakapha, Kaphapitta and Vatakapha Prakruti.

Table 5: Association between sedentary life style and Prakruti

Prakruti		Observed N	Expected N	Df	P Value
Pittakapha	no	1	1.0		
	yes	1	1.0	1	1.000
	Total	2			
Vatakapha	no	8	7.5		
	yes	7	7.5	1	.796
	Total	15			
Kaphapitta	no	18	17.5		
	yes	17	17.5	1	.866
	Total	35			
Kaphavata	no	9	24.0		
	yes	39	24.0	1	.000
	Total	48			

Psychological impact
Under psychological impact, following variables were significant. Anxiety in Kapha vata Prakruti (P= .021), Krodha (anger) in Kaphavata Prakruti (P = .009), Kaphapitta Prakruti (.028), stress in Kaphavata Prakruti (P = .001). All these variables were computed to a single variable as Psychological impact and its relation with Prakruti was assessed and the following result was obtained.

Table 6: Association between psychological impact and Prakruti

Prakruti		Psychological impact
Vatakapha	Chi-Square	12.600[a]
	Df	5
	Asymp. Sig.	.027
Kaphapitta	Chi-Square	15.229[b]
	Df	5
	Asymp. Sig.	.009
Kaphavata	Chi-Square	19.000[c]
	Df	5
	Asymp. Sig.	.002

Psychological impact was significantly seen Vatakapha Prakruti with P Value = .027, in Kaphapitta with P Value =.009 and in Kaphavata with P Value = .002
The relation between the etiological factors of type 2 Diabetes Mellitus of whole 100 samples was seen with the occurrence of disease and was found significant in all the factors.
The result was observed as follows,

Table 7: Significance of risk factors of type 2 diabetes mellitus

	Sedentary	Family history	Psychological impact	Diet
Chi-Square	7.840[a]	5.760[a]	45.440[b]	33.380[c]
Df	1	1	5	8
Asymp. Sig.	.005	.016	.000	.000

Sedentary life style was significant with P Value = .005, family history was found significant with P Value = .016, Psychological impact was found significant with P Value = .000 and diet was also found significant with P Value = .000.

DISCUSSION

Age wise distribution of 100 patients of type 2 Diabetes Mellitus showed that maximum ie,50% were in age group of 51- 60years, 40% were in age group of 41- 50 and 10% were in age group of 31-40.This finding shows a prevalence of type 2 Diabetes Mellitus in middle age to older age. Majority of the patients were females i.e.52% and males were 48%.Global prevalence rates are similar between male and female. Religion wise distribution of 100 patients of type 2 Diabetes Mellitus showed that maximum i.e. 90% were of Hindu community, 5% of Christian community and 5% of Muslim community. As such there is no relation between religion and occurrence of this disease. This result may be due to Hindu predominance in the study area. Among 100 patients of type 2 Diabetes Mellitus, 44% reported their occupation as home maker, 39% as field work and 17% as desk work. Most of the patients were home makers who led a sedentary life. It is considered to be one among the etiological factors of type 2 Diabetes mellitus. Among 100 patients, 45% were of mixed diet and 55% were of vegetarian. But this observation cannot be generalized. Out of 100 patients, 57% were of overweight, 40% were of normal weight and 3% were of underweight. Obesity acts as diabetogenic factor through increasing resistance to the action of insulin in those genetically predisposed to develop Type 2 DM. Diabetes is a common disease which is reaching epidemic proportions in many parts of the world. Type 2 diabetes accounts for more than 90% of the diabetic population worldwide. Both genetic and environmental factors are going to contribute in the development of the disease. The rising prevalence of type 2 diabetes appears to be greatly related to the increasing prevalence of overweight and obesity globally. Obesity is one of the most important risk factor for the present epidemic of non communicable diseases like diabetes, hypertension, and coronary heart disease. Obesity is known to contribute 55 – 90% of cases of type 2 diabetes. Even though in India non obese type 2 diabetes is more common than in the western world, obesity still remains as an important risk factor. The two conditions are so much interlinked that the new terminology combining both the condition has come as 'Diabesity'. However all obese people are not diabetic. An adipocyte hormone called 'resistin' is known to provide link between obesity and diabetes.[11]

First objective was to see the most prone Prakruti. It was assessed by taking the frequency of each Prakruti.As per study, 48% of the patients were of Kaphavata Prakruti. Characteristic features of two Dosha will be observed in constitution with domination of two Dosha. Hence in KaphaVata Prakruti, features of both Kapha and Vata will be appreciable. Due to Manda and Stimita Guna the basic nature of Kapha Prakruti people will be to lead a sedentary life. Due to Sara and Sandra Guna, they have a hidden tendency to gain weight. Because of Yogavahi property instead of manifesting its own attributes, Vata manifests the attributes of the Dosha with which it is combined. It is the property of a Yogavahi substance to accentuate the attributes of the matter to which it is added. In the study 48% of type 2 Diabetes Mellitus are of Kaphavata Prakruti followed by 35% are of Kaphapitta by which it is observed that Kapha predominant Prakruti is prone to get type 2 Diabetes Mellitus. The Samanya Nidana mentioned reveals the fact that Kapha Dosha to be the Pradhana Dosha involved in the manifestation of the disease Prameha. Due to Samanata between the Nidana and the Prakruti there is every chance of manifestation of disease in Kapha Prakruti. More over the Kapha Prakruti has the hidden tendency to lead a sedentary life. They are having more chances of getting obesity. These both factors increase the risk of type 2 Diabetes Mellitus

While considering whole sample n=100, 62% were having family history of type 2 Diabetes Mellitus. People with positive family history have more chance of getting diabetes as there is genetic disposition in this disease. Even though 11 of Vatakapha Prakruti (n=15), 23 of Kaphapitta Prakruti (n=35) and 26 of Kaphavata Prakruti (n=48), were having positive family history, relation between these two were observed to be non significant. (Table no:1) Madhumeha is also considered as Kulaja Vikara caused due to the defect in Beeja Dosha. The genes of his parents are afflicted with the Dosha which are responsible for the causation of Prameha in them. This proves the familial aggregation, where most of diabetic patients are having family history. Various studies have been conducted in this regard. It has been concluded that family history of type 2 DM had significant effect on individuals with metabolic syndrome as compared to their counterparts (individuals having no family history of type 2DM). It therefore seems reasonable to argue that family history of type 2DM could be useful as a predictive tool for early diagnosis and prevention of metabolic syndrome in Asian Indian

population. In the present study it was observed that it has got no relation with the Prakriti of an individual.

Diet was found significant in Kaphavata Prakruti and was non significant in all the other three Prakruti (Table no: 2). Number of patients was more in Kaphavata Prakruti. This may be the probable reason for the significance. Intake of milk, curd, sugar etc in increased frequency, in more quantity and in long duration has a role to play in disease manifestation. As these are Kaphakara Nidana, they can easily affect Kapha Pradhana Prakruti and the same is observed in the study. A balanced diet comprising of diverse and healthy foods is key to promoting good health. After all, we are what we eat - Research continues to prove that eating healthy food promotes good health and unhealthy food habits lead to a diseased body. Foods contain vital nutrients that aid our body's metabolic function.

Lifestyle is a way a person lives. This includes pattern of social relations, consumption, entertainment and dress. A lifestyle also reflects an individual's attitudes, values or worldview. Sedentary life style was found significant with Kaphavata Prakruti with P Value = .000 and was found non significant in Pittakapha, Kaphapitta and Vatakapha Prakruti (Table no: 5). Among Kaphavata Prakruti, n=24 are coming under the age group of 51 – 60 and there is every chance of leading a sedentary life. Physical activity is an important determinant of insulin sensitivity. Inactivity is associated with down regulation of insulin-sensitive kinases. Sedentary people are therefore more insulin-resistant than active people with the same degree of obesity. Moreover, physical activity allows non-insulin-dependent glucose uptake into muscle, reducing the 'demand' on the pancreatic β cells to produce insulin.[12]

As those variables are in small sample it needs to be studied in a large sample before establishing any psychological behavior specific to Prakruti. Psychological impact was significantly seen Vatakapha Prakruti with P Value = .027, in Kaphapitta with P Value =.009 and in Kaphavata with P Value = .002. Thus irrespective of all Prakruti, Psychological impact was having a significant role in the manifestation of the disease (Table no: 6).Stress has long been suspected as having major effects on metabolic activity. The effects of stress on glucose metabolism are mediated by a variety of "counter-regulatory" hormones that are released in response to stress and that result in elevated blood glucose levels and decreased insulin action. This energy mobilizing effect is of adaptive importance in a healthy organism. However, in diabetes, because of a relative or absolute lack of insulin, stress-induced increases in blood glucose cannot be adequately metabolized. Thus, stress is a potential contributor to chronic hyperglycemia in diabetes, although its exact role is unclear.

In the study, it was observed that Kapha Predominant Prakruti is prone towards type 2 Diabetes Mellitus. While considering the etiological factors most of them are resulting in the vitiation of Kapha Dosha. This will result in the easy vitiation of the Guna of Kapha Dosha and it supports the disease manifestation. Here, the Kapha Prakruti also acts as a supporting factor. By this, the Kapha Prakruti people are prone compared to other Prakruti. Asya Sukha, Swapna Sukha, intake of Kaphakara Ahara etc in increased frequency and for a long time leads to the vitiation of Kapha and it triggers the manifestation of the disease.

All the etiological factors were found significant relation with type 2 Diabetes Mellitus while considering the whole sample size. Sedentary life style was significant with P Value = .005, family history was found significant with P Value = .016, Psychological impact was found significant with P Value = .000 and diet was also found significant with P Value = .000(Table no: 7).This shows that these are having some role in the manifestation of the disease. In other words they can be considered as the Vikara Vighatakara Bhava Abhava, i.e, those factors which support the manifestation of disease, which is explained under the Prameha nidana of Charaka Samhita[13].

CONCLUSION

In the study it was found that all Prakruti persons are having chance to get type 2 Diabetes Mellitus, among them Kapha Pradhana Prakruti was found to be prone to type 2 Diabetes Mellitus. Genetic predisposition, diet, life style and psychological impact have got a significant relation with the manifestation of type 2 Diabetes mellitus irrespective of Prakruti. Knowledge of the most susceptible Prakruti will help the individuals to rethink about their diet and life style. It is one among the silent killer and it needs to be treated as early as possible to stop further complications and many formulations are indicated for the same [14]. The knowledge of susceptible Prakruti will help for the primary prevention of the disease and the manifestation of the disease can be controlled to an extent.

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