

LIFE STYLE, OBESITY, TYPE A PERSONALITY PATTERN AND TYPE-2 DIABETES MELLITUS – IS THERE A CORELATION?Madhu Nijhawan¹, Rajyashree Singh², Amit Nijhawan³, Rajinder Pal Singh⁴, Sameer Saharan⁵**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: IMPORTANCE: Diabetes mellitus has shown a rising trajectory to an epidemic level in the last century due to changes in human behavior and lifestyle. Personality assessment might further clarify the relationships between psychological characteristics and glucose regulation. **OBJECTIVE:** To find out difference with regard to socio demographic factors, lifestyle pattern and type A personality patterns between the experimental group and the normal controls. **DESIGN:** A case-control study was used. Period of collection of data extended from 15th Dec 2012 till 10th Jan 2013. **SETTINGS:** This study was conducted at the Medicine outpatient departments of Mahatma Gandhi Hospital in Jaipur. **PARTICIPANTS:** A consecutive sample of 50 adults with type 2 diabetes aged 20-80 years and 50 normal subjects matched on age, sex, education and marital status. **MAIN OUTCOME MEASURES:** Uncontrolled Type 2 Diabetes Mellitus diagnosed in Medicine Outpatient setting, their socio demographic variables, lifestyle patterns and premorbid personality traits. **RESULTS:** Analysis of data revealed that 84% of the subjects in the experimental group were from urban background and 70% lived in a nuclear family set up with 50% having less than 5 members in the family. A positive family history of Diabetes in first degree relatives was present in 48% and just 8% of the control group. 70% were not following healthy eating habits as opposed to just 38% of the control group. 40%, 34% and 26% of the subjects in the experimental group used to consume a high sugar, fat and salt diet, respectively. Nearly 76% as opposed to 26% of the control group led a sedentary life. 80% of the experimental group had no hobbies with 19% enjoyed watching T.V. 78% as compared to just 30% in the control group were either overweight or obese. 82% had type A personality traits being high on all its components as compared to just 20% in the control group. **CONCLUSION:** Type II Diabetes Mellitus is more prevalent in urban, small nuclear families, a family history especially in first degree relatives, unhealthy lifestyle practices, obese and those with type A personality traits. Thus majority of the cases can be prevented by adoption of a healthier lifestyle and through a holistic multidisciplinary management approach.

KEYWORDS: Life Style, Obesity, Type A Personality, Type 2 Diabetes mellitus.

INTRODUCTION: Diabetes is a major lifestyle disease. Changes in human behavior and lifestyle have resulted in a dramatic increase of diabetes worldwide. The prevalence among adults aged 20-70 years is expected to rise from 285 million in 2010 to 438 million by the year 2030.¹ The main impact of worldwide explosion in diabetes will be in the developing countries with a predicted increase of 170%.²

The epidemic is chiefly of Type 2 Diabetes and its associated condition known as 'diabesity' and 'metabolic syndrome.' In addition to genetic susceptibility, environmental and behavioral factors

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such as a sedentary lifestyle; overly rich nutrition and obesity are responsible for its causation.³ Diabetes and its complication results in huge premature morbidity and mortality.³

Diabetes mellitus is caused by a complex interaction of genetics and environmental factors.⁴

Insulin resistance seen in type II Diabetes is often associated with abdominal obesity and hypertriglyceridemia. Although most individuals diagnosed with type 2 DM are older, however the age of diagnosis is declining, as there is a marked increase among overweight children and adolescents.⁴

The rising prevalence of diabetes in India⁵⁻¹² and other developing countries is mainly attributed to urbanization.^{3,13,14} Urbanization and internal rural to urban migration results in several adverse impacts like decreased physical activity, poor dietary habits, shift toward high energy foods and body mass index and upper body adiposity increase.¹ Over the years the association between regular physical activity and health and especially with coronary heart disease has been reinforced by several scientific reports resulting in generation of intense interest in the effects of physical activity on insulin sensitivity, glycemic control and the incidence of Diabetes.¹⁵⁻¹⁸

Being overweight is the number one risk factor for Type 2 Diabetes. Modest reduction in weight can help prevent, control or even stop progression of Type 2 Diabetes. Weight-loss should be considered if their Body mass index is 25-29 or higher.¹⁹ Sedentary habits, less physical activity coupled with many times munching high energy stuff during sitting especially watching TV are associated with significantly higher risk for obesity and Type 2 Diabetes. Regular exercise even of moderate intensity improves insulin sensitivity.

The potential to prevent Type 2 Diabetes in high risk individuals by multiple lifestyle interventions and not just those directed exclusively towards obesity management has been firmly established.²⁰ The Finnish Diabetes Prevention Study demonstrated that none of the high risk i.e. overweight and relatively sedentary individuals with impaired glucose tolerance developed Diabetes if they reached 4 or 5 of the 5 predetermined lifestyle targets which were weight loss >5%, fat intake <30% energy, saturated fat intake <10% energy, increase of dietary fiber to $\geq 15\text{g}/1000\text{kcal}$ and physical activity of at least 4h/week.²¹

The mind and body connection is very powerful. It has been found that people who have good emotional health have healthy relationship and a healthy body. It was found that men with low antagonism or high agreeableness had a lower risk of having Diabetes or prediabetes. Among both men and women, the lowest risk of diabetes and prediabetes was found in those with a high capacity for feeling pleasure, having strong feelings of happiness and has learned to be aware of their feelings.²²

Diabetic patients have been found to be significantly high on Type A personality pattern.²³ Several researches have reported the following typical characteristics of Type A personality – Urgency, Impatience, Aggressiveness which shows up as Impatience, Rudeness, being easily upset over small things excessively strong achievement orientation. They also seem to show physical characteristic as facial tension, tongue clicking, teeth grinding.²⁴ Patients with coronary heart disease were likely to have negative effects such as hypertension, job stress, social isolation^{24,25} and these behaviours are also found to be common in patients with diabetes.

The present study was undertaken to explore the extent to which patients of Diabetes mellitus vary from normal subjects with respect to their socio-demographic factors, lifestyle patterns and Type A Personality traits. Such detailed exploration of personality assessment might further

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clarify the relationships between psychological characteristics and glucose regulation improving one's ability to predict Diabetes control in the proper direction.

METHODS: SAMPLE: For the study two groups comprising of 50 subjects each were considered. The experimental group (Group A) comprising of consecutive patients of uncontrolled diabetes mellitus having HbA_{1c} level $\geq 7\%$ ($1\% = 0.1\text{mmol}$), aged 20-80 years attending Medicine outpatient for clinical evaluation and lab investigations. Obvious damage to nervous system, any concomitant disease affecting their functioning and presence of any serious complication of diabetes was ruled out.

The other group of normal controls (Group B) preferably persons accompanying the patients visiting the general OPD of the hospital matched on age, sex, education, income and marital status. After thorough evaluation and history taking, subjects, who themselves/ their informants did not report prior history of any psychiatric illness, were selected from both the groups.

PROCEDURE: The principles outlined in the Declaration of Helsinki were followed. A written informed consent was taken from the eligible subjects. All the subjects were then interviewed and a detailed history was taken by using a specially designed Proforma. Following which they were administered the Hindi version of Type A/B Behavioral Pattern Scale²⁶ to assess their premorbid personality type. All the data was to be provided in retrospective perspective i.e. when they were in a disease-free state.

MEASURES: All the subjects underwent a detailed interview using a specially designed proforma comprising of sections of personal identification, socio demographic details, illness characteristics including its duration and course, age of onset, and a section requiring provision of details of physical and leisure activity, dietary habits and attitude towards food.

The subjects were then presented Hindi version of a 33-items comprising of Form A and Form B measuring Type A and B Behavioral pattern in Indian context. The personality of an individual is a mixture of both the types, A as well as B and hence it is necessary to measure both the personality types separately so that it could be determined how much of both the personality types a person is having. One may be oriented more towards a particular type which was considered in the study.

STATISTICAL METHODS: The data thus collected was subjected to chi square test to find out their statistical significance and the level of significance is 0.05.

RESULTS: The socio-demographic profile (Table 1) of the study population depicts that majority i.e. 62% of the subjects in Group A were in the age group of 51-70 years, 16% were above the age of 70 years and only 8% were below the age of 40 years. A significant proportion of them were females being around 58% in Group A and 52% in Group B with males being just 42% and 48%, respectively.

Their educational status revealed that 40% in Group A and 48% in Group B were illiterates. In Group A, 18% were educated up to the primary level, 16% were middle pass, 8% were educated up to the secondary and senior secondary level, 12% were graduate and 6% had done their post-graduation.

Distribution according to religion shows that majority of the subjects i.e. 90 and 94% were Hindus in the two groups A & B, while just 10% and 6% were Muslims. Majority i.e. 90% in Group A

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and 92% amongst the Group B were married. It is evident from the distribution according to occupation that 42% were housewives and 12% were farmers as opposed to 30% and 22% in Group B.

Within Group A, 10% each were involved either in business or semi-skilled work, 6% each were involved in unskilled work or were either professionals or retired. The results of socioeconomic status (SES) on the basis of modified kuppaswamy scale revealed that majority i.e. 46% was from upper-lower SES and 22% belonged to lower middle class. On comparison with Group B which has 12% subjects in the upper-middle class, there were 26% subject of the other group. Age, gender, marital status, religion, educational and occupational status were not statistically significant.

Distribution of the studied population according to domicile was statistically significant with majority of the subjects in Group A i.e. 84% from urban background and just 16% from rural areas. The Group B showed a different distribution, wherein 56% of the subjects were from rural areas and 44% from the urban background. Family type distribution shows that in Group A majority of the subjects i.e. 70% were living in a nuclear family set-up as against 42% in Group B. Analysis of the data according to family size reveals that 50% had less than 5 members, 24% between 5-10 members and 26% more than 10 members in the family.

When compared with Group B 72% had 5-10 members and just 20% had a family of less than 5. Distribution according to family type and its size were also found to be statistically significant. A positive family history of diabetes especially in first degree relatives was present in 48% subjects of Group A while the Group B has a family history of diabetes in only 8%. The difference was found to be statistically significant. When the data were analyzed in light of gender and family history, 55% of the females had a positive family history of diabetes mellitus, though this was not statistically significant.

On analysis of data of age of onset of disease i.e., HbA_{1c} levels and course of illness (Table 2) it was found that 38% of the subjects detected to have diabetes between the age of 51-60 years, 26% between 41-50 years, 20% between 61-70 years and just 4% after 70 years and 12% before 40 years of age. 60% of the subjects had HbA_{1c} levels between 7-10, 38% between 11-15 and only 2% had a value above 15. 54% of the subjects had a fluctuating course, 18% a deteriorating course and 12% reported no change in their condition. Only 16% subjects reported an improvement in their condition.

Dietary habits (Table 3) of the Group A subjects as well as their attitude towards food revealed that around 76% were not following healthy eating habits. Around 40% consumed more sugar than normal, 34% a high fat diet and 26% a high salt diet prior to the onset of diabetes. Though the difference is not at 0.05 levels of significance it is found to be significant at 0.07 levels. When their level of physical activity was analyzed it was found that 76% of the subjects were leading a sedentary life as compared to only 26% in Group B. In Group A, 80% enjoyed no leisure activity with 80% either sleep or sit idle and 18% watched television.

While in Group B just 24% reported that they spent their leisure time by sleeping, 24% were interested in watching television and almost 38% were busy in socializing or spending quality time with their children and grandchildren. Assessment of Body Mass Index (BMI) results revealed that in Group A 78% were overweight or obese and only 14% has their values within the normal range while in Group B, 30% were either overweight or obese and 60% were within the normal range.

Only 8% of the subjects in Group A were found to be underweight. Attitude towards food, physical and leisure activity as well as the BMI values were all found to be statistically significant. The

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premorbid personality typology was significant statistically ($p < 0.05$) and revealed that 82% of the Group A subjects had predominantly type A personality features whereas Group B was found to be high on type B features with just 20% showing type A personality features.

When the individual components of type A personality were assessed the Group A subjects were found to score high on all the variables with highest scores ranging from 87% to 92% on tenseness, impatience and restlessness and 56% to 63% on being achievement oriented, dominating and workaholic.

COMMENTS: The present study included majority of studied subject in the age group of 51-70 years, Hindu by religion, married, females, illiterates, unemployed and belonged to upper-lower socioeconomic status. Though these socio demographic variables involving the experimental as well as the control group were not found to be statistically significant but as far as the occupation was concerned there were almost double the number i.e. 22% of subjects present in the category of farming profession in the control group as against 12% of the experimental group which involves a lot of physical activity.

These findings support those of Hu et al^{27,28} who also reported that increased physical activity is associated with a significant reduction in risk for diabetes. Tanasescu et al²⁹ also reported that physical activity reduces cardiovascular mortality in those with pre-existing diabetes. Despite the scientific evidence and the organizational efforts, these messages have not reached the masses, because physical activity is vastly under-utilized in the management of diabetes and majority of individuals remain sedentary or do too little exercise to achieve health benefits.

Majority of the subjects in the experimental group belonged to urban setting, a finding suggesting that Type 2 diabetes is more of an urban disease and the difference could be due to differences in lifestyle, eating habits, level of physical activity and presence of sedentary habits. Analysis of the data according to family type and its size revealed that mostly those with less than 5 members in the family constituted the diseased group. This is indicative of the protective role of family against development of disease as the joint family system acts as a supporting system, as a buffer in reducing stress and it provides a sense of relief and belongingness in times of crisis.

The relationship between gender and family history was not found to be statistically significant. Our findings supported those of Nakanishi et al³⁰ who reported that family history of diabetes mellitus was an important predictor of type 2 diabetes development especially in women as 55% of females were found to have a positive family history of diabetes in their first degree relatives. Majority of the subjects had higher HbA_{1c} values (in the range of 10-15 or ≥ 15) with a fluctuating or a deteriorating course of illness.

The importance of glycemic control as part of the comprehensive management of diabetes is well documented but on interviewing the subjects it was revealed that most of the patients with diabetes do not get regular HbA_{1c} testing. Though a number of reports suggest that the patients of Diabetes who maintain near normal HbA_{1c} values can gain an extra five years of life, eight years of sight and six years free from kidney disease.³¹⁻³⁴

The patients with diabetes were fussy about food choices and were consuming an overly nutritious diet being higher on all the parameters considered to be enemies of healthy living including sugar, fat and salt prior to the onset of the disease. These findings supports those of Salmerón et al,³¹ van Dam et al,³² and Schulze et al^{33,34} who also reported that a diet high in saturated

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fat and sugar is associated with weight gain and incidence of diabetes mellitus. In fact majority of the individual's attitude regarding their eating habits did not get altered even after being diagnosed with diabetes which requires significant dietary modifications in addition to other interventions.

The study thus concludes, in accordance with a vast treasure of existing reports that the disease was more prevalent in the urban population; in those living in small nuclear families; in presence of a positive family history of diabetes especially in first degree relatives; those following an unhealthy lifestyle practices i.e. sedentary habits, watching television, less physical activity, unhealthy eating habits- presence of food fads, consuming a diet rich in sugar, fat and salt; those high on type A personality traits and obese individuals. And hence it could be rightly justified that management of the patient of type-2 diabetes needs to be dealt with a holistic or multidisciplinary approach which should involve not only pharmacological intervention with anti-diabetic drugs but also modification in lifestyle as suggested by Crandall et al.³⁵

Innovative programs like self-efficacy based exercise intervention for relatively inactive persons and also management of associated anxiety and depression. Stress management strategies to be adopted in order to reduce the stress level of day to day life which in turn will help in regulating blood sugar level. Psych education of the patient as well as the family for better blood sugar level control and prevention of associated complications are some of the important areas to be taken care of while designing a management protocol of a patient of diabetes.

No question, lifestyle changes are a challenge. It takes time to make new healthy eating habits and physical activeness, a part of one's routine. But maybe one need to rethink one's approach. This study has some limitations. Firstly, the sample size is small and general hospital's outpatient based which may result in the recruitment of more patients that had difficulty controlling hyperglycemia by conventional methods or a patient group with different characteristics from the general diabetes population such as those with a higher cardiovascular risk.

Thus the study sample may not accurately reflect the full spectrum of characteristics found in the target population and the findings can also not be generalized. Secondly, it is a cross sectional study and some of the data is collected retrospectively so, possibility of some deficit or lacunae in the information cannot be ruled out and a longitudinal study may be more informative.

PREVIOUS PRESENTATION: This study was presented as paper in the annual conference of Rajasthan Chapter of Indian Psychiatric Society held on 7th and 8th September, 2013 at Geetanjali Medical College and Hospital, Udaipur.

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	Exp. grp (n=50)	Control (n=50)	Statistics (χ^2)	df	P value
Age group					
<40	4 (8%)	4 (8%)			
41-50	7 (14%)	7 (14%)			
51-60	16 (32%)	18 (36%)			
61-70	15 (30%)	15 (30%)	0.73	4	0.95
>70	8 (16%)	6 (12%)			
Gender					
Male	21 (42%)	24 (48%)			
Female	29 (58%)	26 (52%)	0.36	1	0.54
Educational Status					
Illiterate	20 (40%)	24 (48%)			
Primary	9 (18%)	8 (16%)			
Middle	8 (16%)	7 (14%)			
Secondary	3 (6%)	3 (6%)			
Senior secondary	1 (2%)	0 (0%)			
Graduate	6 (12%)	6 (12%)	3.28	6	0.77
Postgraduate	3 (6%)	2 (4%)			
Religion					
Hindu	45 (90%)	47 (94%)			
Muslim	5 (10%)	3 (6%)	0.67	1	0.41
Marital status					
Married	45 (90%)	46 (92%)			
Separated / Widow	5 (10%)	4 (8%)	0.24	1	0.62
Occupation					
Farmer	6 (12%)	11 (22%)			
Unemployed ^a	24 (48%)	23 (46%)			
Retired	3 (6%)	2 (4%)			
Professional	3 (6%)	4 (8%)			
Business	5 (10%)	3 (6%)			
Unskilled	3 (6%)	5 (10%)	6.84	7	0.45
Semiskilled	5 (10%)	1 (2%)			
Skilled	1 (2%)	1 (2%)			

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Socio-economic Status^b					
Upper	1 (2%)	3 (6%)			
Upper Middle	13 (26%)	6 (12%)			
Lower Middle	11 (22%)	10 (20%)			
Upper Lower	23 (46%)	31 (62%)	7.68	4	0.10
Lower	2 (4%)	0 (0%)			
Domicile					
Rural	8 (16%)	28 (56%)			
Urban	42 (84%)	22 (44%)	17.4	1	<0.001
Family Type					
Nuclear	15 (30%)	29 (58%)			
Joint	35 (70%)	21 (42%)	7.95	1	.0048
Family Size					
< 5	25 (50%)	10 (20%)			
5 - 10	12 (24%)	36 (72%)			
> 10	13 (26%)	4 (8%)	63.44	2	<0.001
Family History of diabetes					
1° relative	24 (48%)	4 (8%)			
Absent	26 (52%)	46 (92%)	19.8	1	<0.001
Gender and family history of diabetes					
Male	10 (45%)	2 (50%)			
Female	14 (55%)	2 (50%)	0.36		0.55
Tables 1: Socio-demographic profile of the studied group					

a. Unemployed group includes housewives.

b. Socioeconomic status is calculated using Kuppuswamy Scale.³⁶

Age of onset	Exp. Grp. (n=50)
< 40	6 (12%)
41 - 50	13 (26%)
51 - 60	19 (38%)
61 - 70	10 (20%)
> 71	2 (4%)
HbA _{1c}	
7 - 10	30 (60%)
11 - 15	19 (38%)
> 15	1 (2%)
Course of Illness	
Deteriorating	9 (18%)
Improving	8 (16%)
Fluctuating	27 (54%)
Same	6 (12%)
Table 2: Illness characteristics of the studied group	

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Abbreviations: HbA_{1c}- glycosylated hemoglobin.

SI conversion factor: to convert glycosylated Hb to mmol, multiply values by 0.1.

Dietary Habits (High) ^a	Exp. Grp. (n=50)	Control (n=50)	Statistics (χ^2)	Df	P value
Sugar	20 (40%)	10 (20%)			
Fat	17 (34%)	8 (16%)			
Salt	13 (26%)	9 (18%)			
Balanced	27 (54%)	35 (70%)			
Attitude towards food					
Healthy	12(24%)	31(62%)			
Food fad	38(76%)	19(38%)	14.7	1	<0.001
Leisure Activity					
Doing nothing	32 (64%)	3 (6%)			
Sleeping	8 (16%)	12 (24%)			
Playing with children	0 (0%)	10 (20%)			
Watching TV	9 (18%)	12 (24%)	46.59	5	< 0.001
Socializing	0 (0%)	9 (18%)			
Other	1 (2%)	4 (8%)			
Physical Activity					
Sedentary	38 (76%)	13 (26%)			
Physical Activity					
Active	12 (24%)	37 (74%)	25.0	1	< 0.001
Body Mass Index ^b					
Underweight (> 18.5kg/m ²)	4 (8%)	5 (10%)			
Normal weight (18.5 – 25kg/m ²)	7 (14%)	30 (60%)	26.02	3	< 0.001
Overweight (25 – 30kg/m ²)	32 (64%)	14 (28%)			
Obese (> 30kg/m ²)	7 (14%)	1 (2%)			

Table 3: Lifestyle parameters of the studied sample

a. Guidelines of American Heart Institute.³⁷

b. BMI classification as defined by WHO.³⁸

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Personality Type	Exp. Grp. (n=50)	Control (n=50)	Statistics (χ^2)	df	P value
Type A	41 (82%)	10 (20%)			
Type B	9 (18%)	40 (80%)	38.5	1	< 0.001
Individual components of Type A personality					
Tenseness	36 (87.80%)	4(8%)			
Impatience	38 (92.68%)	6(12%)			
Restlessness	38 (92.68%)	7(14%)			
Achievement	26(63.41%)	5(10%)	119.28	5	< 0.001
Dominating	24(58.54%)	4(8%)			
Workaholic	23(56.09%)	4 (8%)			

Table 4: Premorbid personality of the studied sample

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