

Original Research Article

Study of anthropometric parameters in children (18-25 years) of diabetic parents in medical students, Agra

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Abstract

Introduction: Diabetes mellitus is a leading public health care problem in developing and developed world, with increasing incidence and long term complications. It is the most common endocrine disorder in the world today.

Objective: To study the anthropometric parameter in the children whose parents are diabetic and non-diabetic.

Material and methods: 250 medical students of S.N Medical College, Agra, of age group 18–25 years were included in study from year 2015 to 2017. Their anthropometric measurements which included weight, height, BMI were taken. This study was done in physiology department of S.N.M.C. Agra. Subjects were divided into 2 Groups .Children of diabetics parents (Group-1) and Children of non-diabetic parents (Group-2).

Results: Out of total 250 students, 15.2% students were overweight and 2.4% were obese according to WHO classification of BMI. In group 1, out of 64 students, 18.75% were found to be overweight and 3.1% were obese. In group 2, out of 186 students, 13.9% were overweight and 2.15% were obese. The mean BMI of Group-1 and Group-2 was 22.21 ± 3.50 and 22.15 ± 3.19 respectively. P value =0.73 and t=0.33.

Conclusion: Higher percentage of overweight and obese are found in the children of diabetic parents as compare to non-diabetic parents and Mean BMI is slightly higher in group 1 i.e. in the children of diabetic parents but this difference in Mean BMI of both groups is considered to be not significant.

Key words

Anthropometric parameters, Children, Diabetic parents, Medical students.

Introduction

Diabetes mellitus is a leading public health care problem in developing and developed world, with increasing incidence and long term complications. It is the most common endocrine disorder in the world today. Diabetes comprises a group of common metabolic disorders having significant morbidity and mortality. According to the IDF 415 million people in the world live with diabetes in 2015. The number of people with diabetes in India is currently around 69.2 million and 50 % of among these are undiagnosed.

Type-1 Diabetes develops as a result of the synergistic effects of genetic, environmental and immunological factors that ultimately destroy the pancreatic beta cells which leads to insulin deficiency and is ketosis prone. Genetic susceptibility of type-1 Diabetes involves multiple genes. Type 2 Diabetes mellitus is a heterogeneous group of disorders characterized by variable degree of insulin resistance, impaired insulin secretion. Most studies support the view that insulin resistance precedes insulin secretory defect and that diabetes develops only if insulin secretion becomes inadequate. Type-2 Diabetes has a strong genetic component. Genetic defect in insulin resistance or action may not manifest itself unless an environmental event or another genetic defect, such as obesity is superimposed. The risk of becoming a diabetic for an individual with a positive family history of diabetes increases by two- to fourfold. Obesity and body fat distribution, lifestyle, impaired glucose tolerance (IGT), and a family history of type-2 Diabetes, represent risk factors for type-2 Diabetes mellitus.

Simple anthropometrical measurements have been used as measurements of obesity and have more practical value in both clinical practice and for large scale epidemiological studies. BMI, which relates weight to height, is a simple measure of body size. Waist circumference and

waist-hip ratio (WHR) are alternatives to BMI. Waist circumference is the best simple measure of both intra-abdominal fat mass and total fat. A larger hip circumference is associated with a lower prevalence of self-reported type-2 diabetes and lower fasting glucose concentrations, independently of BMI and waist circumference. Individuals with a family history of diabetes have higher WHR. It is a well-known fact that physical activities are less in obese individuals, and obesity is one of the important and most common risk factors of type-2 diabetes mellitus.

Objective

To study the anthropometric parameter in the children whose parents are diabetic and non-diabetic.

Material and methods

250 medical students of S.N Medical College, Agra, of age group 18–25 years were included in study from year 2015 to 2017. Their anthropometric measurements which included weight, height, BMI were taken. This study was done in physiology department of S.N.M.C. Agra. Subjects were divided into 2 Groups. Children of diabetics parents (Group-1) and Children of non-diabetic parents (Group-2).

Inclusion criteria

- Offspring of either sex,
- Age from 18-25 years,
- Students who were willing to participate in the study.

Exclusion criteria

- Students unwilling to participate in the study
- History of impaired glucose tolerance, diabetes, Pregnancy, Malignancy, Hyperthyroidism, Hypothyroidism, Other significant endocrine disorder, Offspring of gestational diabetes, Age less than 18 years and age more than 25 years.

Results

Out of total 250 students, 15.2% students were overweight and 2.4% were obese according to WHO classification of BMI. In group 1, out of 64 students, 18.75% were found to be overweight and 3.1% were obese. In group 2, out of 186 students, 13.9% were overweight and 2.15% were obese. The mean BMI of Group-1 and Group-2 was 22.21 ± 3.50 and 22.15 ± 3.19 respectively. P value =0.73 and t=0.33 (Table – 1 to 3, Chart – 1 to 4).

Table – 1: Distribution of study subjects.

Groups	Number	Percentage
Group-1	64	25.6
Group-2	186	74.4
Total	250	100

Table – 2: Distribution of study subjects according to BMI.

BMI	Group-1		Group-2	
	No.	%	No.	%
< 18.5 (Underweight)	11	17.1	21	11.29
<24.9 (Normal)	39	60.9	135	72.5
<29.9 (Overweight)	12	18.75	26	13.9
≥ 30 (Obesity)	2	3.1	4	2.15

Table – 3: Statistical analysis.

Study group	Mean BMI \pm SD	Statistical Significance	
		t	p
Group-1	22.21 \pm 3.50	0.33	0.73
Group-2	22.15 \pm 3.19		

Chart – 1: Distribution of subjects.

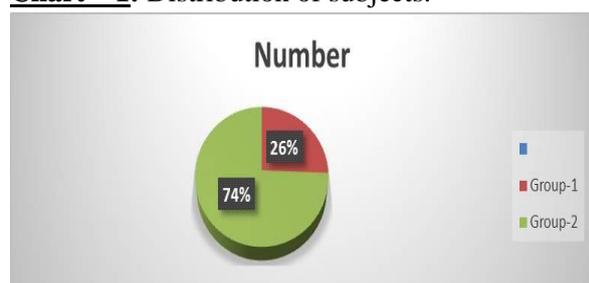


Chart – 2: Distribution of subjects.

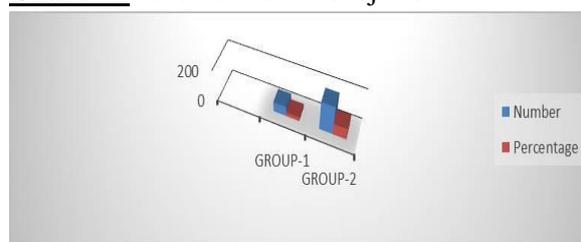


Chart – 3: Distribution according to BMI.

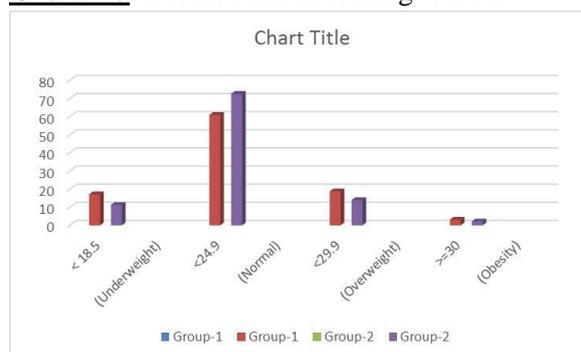
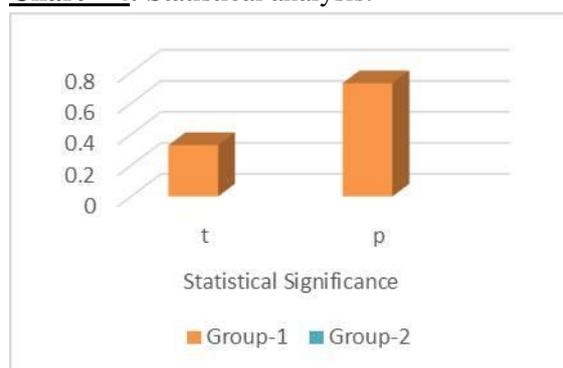


Chart – 4: Statistical analysis.



Discussion

Many studies which are similar to our present study were done previously as stated below.

The study was conducted by Shivangi Agarwal [1] in 2017, on 177 healthy subjects. Height, weight, waist circumference and hip circumference were recorded. Body mass index (BMI), waist to hip ratio (WHR), waist to height ratio (WHtR) was calculated. Information regarding family history of type 2 diabetes mellitus was obtained.

Observations showed that number of individuals with positive family history were only 7.4% and

those who don't have positive family history of diabetics were 76.1% While in our present study, 25.6% students are those having positive family history of diabetes comprises group 1 i.e. while 74.4% students are those whose parents are not diabetic were in group 2.

Most subjects with a positive family history of diabetes had significantly higher BMI i.e. 27.75 ± 4.77 as compared to those without a positive family history having BMI 21.1 ± 2.42 while in our present study mean BMI in group 1 and group 2 was 22.21 and 22.15 respectively. In our present study, although percentage of an individuals who are above their normal weight are more in group-1 i.e. in children of diabetic parents as compare to children of non-diabetic parents. There was no statistically significant difference ($p > 0.05$) in mean BMI between group1 and group2 having P value=0.73. This may be due to less number of students in Group-1 i.e. only 64 out of 250 students.

Another study was conducted by Neenu Khanna [2] in 2015, among 400 healthy adults (20-30 years of age). Derived indices were determined from the basic anthropometric measurements and concluded that all the derived anthropometric indices like BMI, WHR, WHtR reflect significantly increased value in young healthy adults (20-30 years of age) having positive family history of both the chronic diseases type 2 diabetes mellitus and hypertension.

100 candidates were in the category of those having positive family history and 100 candidates were those not having positive family history of diabetes. While in our present study, 64 students are those having positive family history of diabetes comprises group 1 i.e. while 186 students are those whose parents are not diabetic were in group 2.

21% and 7% of candidates were found to be overweight, falls in the category of positive family history and non-diabetic family history respectively while in our present study 18.75%

and 13.9% were overweight in Group-1 and Group-2 respectively.

Mean BMI was 23.01 ± 3.56 in positive family history of diabetes which was higher as compare to mean BMI of 20.76 ± 2.68 in non-diabetic family history while in our present study, Mean BMI in group 1 and group2 was 22.21 and 22.15 respectively.

P value < 0.001 and result was found to be highly significant in Khanna [2] study while in our study there was no statistically significant difference ($p > 0.05$) in mean BMI between group 1 and group 2 having P value=0.73.

A study was conducted by priyanka Rane [3] in 2012, 164 healthy medical students of age group 18 – 25 years. Anthropometric measurements of height, weight, waist circumference, hip circumference were taken. Body mass index (BMI), waist - hip ratio (WHR), waist -height ratio (WHtR) was determined from these basic measures. Statistical analysis was carried using SPSS software.

82 were with family history of diabetes (Cases) and 82 with no family history of diabetes (control group) while in our present study, 64 students are those having positive family history of diabetes comprises group 1 i.e. while 186 students are those whose parents are not diabetic were in group 2.

Among the subjects with family history of diabetes, 57.3% were overweight (according to WHO criteria for Asians) while 18.3% were overweight in control group. While in our present study 18.75% and 13.9% were overweight in Group-1 and Group-2 respectively. Mean BMI in case group was 23.37 ± 2.68 and in control group Mean BMI was 20.89 ± 3.04 while in our present study, Mean BMI in group 1 and group 2 was 22.21 and 22.15 respectively.

BMI, Waist circumference, WHR were statistically more significant ($p < 0.001$) in Rane study [3] while in our study there was no

statistically significant difference ($p > 0.05$) in mean BMI between group 1 and group 2 having P value = 0.73.

Other comparative study was done by Padaki S, et al. [4], in 2011, in medical students of 1st year, SNMC, Bagalkot (Karnataka), in the age group of 18-20 years. Anthropometric measurements (height, weight, waist circumference, hip circumference, thigh circumference, upper segment and lower segment) were recorded. Body mass index (BMI), waist-hip ratio (WHR), waist thigh ratio (WTR), and upper to lower segment ratio (US/LS ratio) were calculated. Statistical analysis between cases and controls was done by unpaired t -test for parameters, such as BMI.

32 apparently healthy medical students in the age group of 18-20 years with family history of type-2 Diabetes Mellitus were chosen and matched with equal number of controls. While in our present study, 64 students are those having positive family history of diabetes comprises group 1 i.e. while 186 students are those whose parents are not diabetic were in group 2.

Mean BMI in cases and controls were 23.7 ± 5.2 and 19.6 ± 3.79 respectively while in our present study although mean BMI is high in offspring of diabetic parents i.e. 22.21 ± 21 as compare to offspring of non-diabetic parents i.e. 22.15 ± 3.19 and there is a significant increase ($P < 0.05$) in the BMI. In our present study, value of p is not statistically significant ($p = 0.07$). This result may be due to lesser number of subjects in group 1 than group 2.

Arvind Kumar, et al. [5] in 2005 conducted a study in which all the cases and controls were subjected to various anthropometric measurements, fasting and postprandial glucose estimation, fasting insulin measurement and fasting lipid profile.

A total of 172 first degree relatives (FDRs) and 178 controls were included. While in our present study, 64 students are those having positive

family history of diabetes comprises group 1 i.e. while 186 students are those whose parents are not diabetic were in group 2.

In Kumar study [5] mean BMI and WHR was found to be approximately equivalent among first degree relatives and controls. While in our present study, mean BMI in group 1 and group 2 was 22.21 and 22.15 respectively which is also approximately equivalent in both groups and value of p is not statistically significant ($p = 0.07$). Another significant study by Marianne A.B. van der Sande [6] in 2001, in which he questioned 5389 adults as to any first-degree family history of major non-communicable diseases (hypertension, obesity, diabetes and stroke), and measured their body mass index (BMI). A significant number of subjects reported a family history of obesity (5.4%), diabetes (3.3%). Individuals with a family history of diabetes had a higher BMI i.e. 24.8 as compare to those who have negative family history of diabetes i.e. BMI 21.0 while in our present study although mean BMI is high in offspring of diabetic parents i.e. 22.21 ± 21 as compare to offspring of non-diabetic parents i.e. 22.15 ± 3.19 .

A significant p value < 0.001 was found in Sande study [6] and their risk of obesity and diabetes was increased and concluded that a family history of hypertension, obesity, diabetes, or stroke was a significant risk factor for obesity and hyperlipidaemia while in our present study, value of p is not statistically significant ($p = 0.07$). The limitations of our present study were that we did not consider 1^o relatives or 2^o relatives in particular. Grossly their parental history of type-2 diabetes was taken into consideration. In this study we have excluded the patients of other endocrinal disorders like hypothyroidism which may also result into obesity which could mislead our study. This study is a pilot study with a small sample considering only the 1st and 2nd year MBBS students of SNMC, Agra. In this study as the number in group 1 was less as compare to group-2, this may be the cause of our non-significant result. The study needs to be extended to the entire population of Agra urban,

which is our future project. Hence, a check on these parameters may help in controlling the predisposing factors and therefore diabetes [7-10].

Conclusion

Higher percentage of overweight and obese are found in the children of diabetic parents as compare to non-diabetic parents and Mean BMI is slightly higher in group 1 i.e. in the children of diabetic parents but this difference in Mean BMI of both groups is considered to be not significant. So this could be more attributed to environmental factors and dietary habits rather than genetic or not affected by the family history of children.

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