

Obesity and Diabetes

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Abstract: Prevalence of Diabetes Mellitus in India is 11.8 percent with men and women equally effected. Among the several causes of diabetes, obesity is projected as the major cause of diabetes. This study is undertaken to see the impact of obesity on diabetes. A diabetic screening camp was organized to screen those with diabetes and record corresponding BMI. Information regarding age, education, occupation, type family, type of diet, was collected from 413 people. Height and weight was recorded and BMI was calculated. Hindus are 86.9 and Muslims constituted 13.1 percent Majority (66.6 percent) are nuclear families, 85.7 percent are non-vegetarians. Age of patients ranged between 20-80 years. Males and females are educated; those with degree level education are 91.9 percent in males and 85.8 percent in females. Employed are 82.6 percent and 12.9 percent males and females respectively. Others are retired officers, or unemployed or doing petty business. Diabetic screening indicated that 56-60 and 71-75 age groups are non-diabetic and BMI is within the normal range. In the age groups of 36-40, 51-55, and 61-65 corresponding BMI is 28.8, 29.3, and 26.9 respectively among males. Among females hundred percent diabetics are in the age groups of 21-25yr,31-35yr,41-45,51-55,56-60, 61-65, corresponding BMI indicated that all these groups have BMI above normal ranging 26.9 to 33.6 among males and 25.4 to 39.4 in females. There is need to conduct education programs.

Keywords: Body Mass Index, Obesity, Diabetes, fasting glucose

1. Introduction

Diabetes is a serious long term condition with a major impact on the lives and wellbeing of individuals, families, societies worldwide (1) Prevalence of Diabetes Mellitus in India is 11.8 percent with men and women equally effected (2). Diabetes Mellitus is due to many factors-prevalence of obesity, physical inactivity, poor diet and urbanization leading to number of patients with type 2 diabetes rising. (3,4). The rising prevalence of overweight and obesity is a significant health challenge in lower and middle income countries, improved economic conditions, urbanization, prevalence of sedentary lifestyles, and dietary changes have caused a steady increase in overweight and obesity . India experiences an ongoing rise in oversight and obesity (5) Obesity is a major cause for diabetes. To identify obesity Body Mass Index (BMI) is used. BMI has a strong relationship to diabetes and insulin resistance. In obese individuals, the amount of non-esterified fatty acids, glycerol, hormones, cytokines, pro inflammatory markers and other substances that are involved in the development of insulin resistance are increased. Weight gain and body mass are central to formation of and rising incidence of type 1 and type 2 diabetes (6). Diabetic Mellitus is a chronic disorder that can alter carbohydrate, protein and fat metabolism. Obesity significantly increases risk for diabetes and high blood pressure and ultimately intertwined with heart disease . In obese persons cells of fat tissues have to process more nutrients than they can manage. The stress in these cells triggers inflammation that releases a protein called cytokines. Cytokines then block the signals of insulin receptors thus gradually causing cells to become resistant to insulin. (7, 8).

There is strong and consistent evidence that obesity management can delay progression from prediabetes to type2 diabetes (9, 10). In overweight and obese patients with Diabetes Miletus, modest and sustained weight loss improves glycemic control and reduces the need for glucose lowering medicines. (11,12) there is need to check the weight regularly .With changing life styles, urbanization,

industrialization and changing polices of the government leading to change in the dietary patterns the present study is undertaken to assess whether obesity and diabetes are related.

Most studies of BMI in India have focused on women respondents. However it is necessary to examine the changing patterns in men's body in order to understand the impact of modifiable factors on men. (13, 14, 15, 16). The present study concentrates on comparison of BMI and diabetes status among both men and women.

2. Methodology

Increasing cases of diabetes in India over years coupled with obesity increasing in all age groups necessitated the need to identify the incidence of diabetes regularly screening camps. Diabetic screening Camp was conducted in the month of December 2019 in the old city of Hyderabad with an objective of identifying people with diabetes. Diagnostic tests were done by Vijaya Diagnostic center and RV Diabetic center. Fasting sugar was estimated both by the investigator and by the diagnostic center. Investigator used select one touch method for testing blood glucose levels. 450 people registered, but final test results were for 413 people. Those who came for checkup are in the age group of 15- 80 years. 258 males and 155 females took the diabetic screening test. Demographic profile consisting of age, type of family, type of diet and family size was collected.. Weight was recorded using standard lever balance, height using the anthropometric rod. Body Mass index was calculated as BMI is reported to have a strong relationship to diabetes (5) Data is presented as percentages.

3. Results and Discussion

Overweight/obesity was more prevalent in urban areas in the southern Region of India and among adults aged 35-49. Improved economic conditions is said to be one of the causes for a steady increase in overweight and obesity. Obesity is said to be one of the major factors causing

diabetes. (9, 10) This study concentrated in collecting the demographic profile, fasting blood glucose levels and BMI of the respondents.

Demographic Profile: Most of the families are nuclear (61.6 percent), joint families are 16.7 and extended families or families with one of the in laws constituted 21.7 percent. (Table 1) Non vegetarians formed a major group (85.7 percent) while vegetarians are 14.3 percent. Majority (86.9 percent) is Hindus and Muslims are 13.1 percent .Age of patients ranged between 20-80 years. (Table 2) As the sample is small in each age group, they are grouped as Males and Females and not by religion.

Table 1: Type of family

Type of family	Hindus	Muslims	Total
Nuclear	61.6 (221)	81.5 (44)	64.2 (265)
Joint	16.7 (60)	11.1 (6)	15.9 (66)
Extended	7.8 (28)	1.9 (1)	7.1 (29)
One -In law	13.9 (50)	5.5 (3)	12.8 (53)
Total	100 (359)	100 (54)	100 (413)

Table 2: Age wise Distribution of subjects

Age in Years	Males	Females
15-20	24	4
21- 25	28	23
26-30	12	4
31-35	26	20
36-40	32	8
41-45	28	36
46-50	20	16
51-55	32	16
56-60	4	14
61-65	16	4
66-70	20	8
71-75	12	8
>76	4	4
Total	258	155

Both males and females are educated. Among males 91.1 percent are graduates and 8.9 percent are postgraduates or with professional degrees. Among females' majority (85.8) are graduates, those up to high school are 7.7 percent and postgraduates are 6.5 percent. (Table 3)

Table 3: Educational Level of Subjects

Education	Males		Females	
	%	No	%	No
High School	0	0	7.7	12
Graduates	91.1	235	85.8	133
Post graduates	8.9	63	6.5	10
Total	100	258	100	155

Occupation wise 82.6 percent of males are employed in government or private sector, retired officers constitute 17.4 percent. Among females employed are 12.9 percent, unemployed or doing petty business constitute the majority group (79.4 percent) retired officers are 7.7 percent. (Table 4)

Table 4: Occupation of Subjects

Occupation	Males		Females	
	%	No	%	No
Unemployed	0	0	79.4	123
Employees /business	82.6	213	12.9	20
Retired Officers	8.9	63	7.7	12
Total	100	258	100	155

Screening of individuals for diabetes: Among the males category (Table 5) 100 percent nondiabetics are in the age groups of 15-20, 26-30, 56-60 and 71-75. Comparing these non-diabetic category people with corresponding BMI indicated that in the 15-20 year and 26-30 group, they are obese and nondiabetic. It can be due to their young age, small sample size and may be they are more active. In the 56-60 and 71-75 age group entire group is non-diabetic and BMI is also within the normal range. It is to project that in the age group of 31-35, the average BMI of the 26 diabetic patients is BMI 33.6, which is obese class I. In the age groups of 36-40, 51-55, and 61.65 corresponding BMI is 28.8, 29.3, 26.9 respectively

Among females, non-diabetic (100 percent) are in three age groups - 36- 40 years, 71-75 and above 76 year group and BMI is also in the normal category. Hundred percent diabetics are in the age groups of 21-25yr, 31-35yr, 41-45, 51-55, 56-60, 61-65. The corresponding BMI indicates all these groups have BMI above normal. In fact in the obese class I category are the age groups 61-65 and 66-70. In other groups where BMI is above normal, percent diabetics are more.

Table 6: Consolidated data.

	Males		Females		Total	
	%	No	%	No	%	No
No diabetes	43.8	113	20	31	34.9	144
Diabetics	56.2	145	80	124	65.1	269
Total	100	258	100	155	100	413

The consolidated Table 6 indicates that among males diabetic people are 56. 2 percent and in females and 80 percent diabetic. As per BMI females are more overweight and obese compared to males.

4. Conclusion

The study revealed that majority males and females are overweight. Sedentary type of occupation with little or no exercise might be the contributing factor for obesity linked diabetes. Although all are educated, the need to follow dietary guidelines and the need for regular exercise is not seen. Education programs needs to be strengthened. .

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Table 5: Age wise Distribution of Individuals as compared to BMI

Age Group	Males							Females						
	Normal		Diabetic		Total		BMI	Normal		Diabetic		Total		BMI
Years	%	No.	%	No.	%	No.		%	No.	%	No.	%	No.	
15-20	100	24	0	0	100	24	28.1	50	2	50	2	100	4	39.4
21-25	50	14	50	14	100	28	23	0	0	100	23	100	23	25.5
26-30	100	12	0	0	100	12	27.1	75	3	25	1	100	4	25.4
31-35	0	0	100	26	100	26	33.6	0	0	100	20	100	20	27.4
36-40	0	0	100	32	100	32	28.8	100	8	0	0	100	8	19.9
41-45	71.4	20	28.6	8	100	28	28.9	0	0	100	36	100	36	27.5
46-50	60	12	40	8	100	20	26.6	25	4	75	12	100	16	29.6
51-55	0	0	100	32	100	32	29.3	0	0	100	16	100	16	26.6
56-60	100	4	0	0	100	4	22.2	0	0	100	4	100	4	29.6
61-65	0	0	100	16	100	16	26.9	0	0	100	4	100	4	30.4
66-70	60	12	40	8	100	20	27.6	50	4	50	4	100	8	31.6
71-75	100	12	0	0	100	12	21.6	100	8	0	0	100	8	22.6
>76	75	3	2	1	100	4	26.5	100	4	0	0	100	4	24.7
	43.8	113	56.2	145	100	258		20	31	80	124	100	155	