

A Cross Sectional Survey Determining Prevalence and Risk Factors Associated with Obesity: An Institutional Based Study

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ABSTRACT

Background: There is an increase in the risk of cardiovascular diseases by several folds when it is associated with abdominal obesity, hypertension, glucose intolerance or dyslipidaemia. Various preventive programmes have been executed by the health care authorities for its prevention. The present study was conducted to evaluate the risk factors and prevalence of obesity amongst the subjects reporting to the institute.

Materials and Methods: The present questionnaire based cross sectional study was done in the Department of Medicine, KPC Medical College and Hospital, Jadavpur, Kolkata, West Bengal, India. Physical activity levels of each patient were recorded. An inextensible measuring tape was used to measure the waist and Hip ratios. It had a width of 1.0 cm. Individuals were made to wear minimal clothes and stand upright for all the measurements. Body mass index of the subjects was calculated using a standardised formula of weight divided by height in square meters. All the recordings were done in a predesigned and pretested proforma. The data thus obtained was arranged in a tabulated form and analysed using SPSS software.

Results: A total of 400 subjects were enrolled in the study, out of these, 230 were non-obese and 170 were obese. There were 40.9% males and 59.1% females who were non obese. The rest 66 males and 104 females were obese. Amongst 252

married subjects, 161 were non obese and 91 were obese. The mean BMI amongst the subjects was 26.64 +/-4.22. Amongst obese subjects, the BMI was 29.61 +/- 2.12 and non-obese subjects it was 23.15 +/- 2.12. There was a significant difference in BMI amongst obese and non-obese subjects.

Conclusion: Prevalence of obesity is increasing at a tremendous rate. In the present study also it was highly prevalent. There was significant effect of physical activity on the obesity incidence.

Keywords: Obesity, Prevalence, Physical Activity, Risk.

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INTRODUCTION

The modifiable risk factor for various preventable diseases like type 2 diabetes mellitus,¹ cardiovascular disease² and few types of cancers³ is obesity. It is becoming a worldwide epidemic with variation in prevalences across the entire world and amongst different races.^{2,4} According to the data by National Health and Nutrition Examination there was approximately two third of the adult population of USA were overweight and one third were obese in the years 1999-2008.⁵ There is an increase in the risk of cardiovascular diseases by several folds when it is associated with abdominal obesity, hypertension, glucose intolerance or dyslipidemia.⁶ There is a surge in the obesity prevalence and its associated disorders in both developing and developed countries. As per the Center for Disease Control and Prevention, obesity costs about \$147 billion in the united states in the year 2008. Various policies have been developed now in the country to prevent and manage this ever increasing problem of obesity.⁷

Obesity involves interactions amongst genetic, environmental and psychosocial factors and hence it is multifactorial in nature. Dietary and lifestyle factors play a key role in acting as risk factors for obesity, although genetics also plays a hand in its causation.⁸ Therefore it is the need of the hour to determine the various risk factors for obesity and educate the subjects regarding its harmful effects. Various preventive programmes have been executed by the health care authorities for its prevention. The present study was conducted to evaluate the risk factors and prevalence of obesity amongst the subjects reporting to the institute.

MATERIALS AND METHODS

The present questionnaire based cross sectional study was done in the Department of Medicine, KPC Medical College and Hospital, Jadavpur, Kolkata, West Bengal, India. Ethical committee clearance was obtained from the institute's ethical

board and subjects were completely informed about the study and a written consent was obtained. Only subjects aged between 21-60 years were included in the study. Pregnant and lactating females were excluded from the study. Subjects belonging to ASA grade III or IV were also excluded from the study. Entire details about demographics were obtained from the subjects. This included information about age, gender, socioeconomic and marital status. Physical activity levels of each patient were recorded. An inextensible measuring tape was used to measure the waist and Hip ratios. It had a width of 1.0 cm. Individuals were made to wear minimal clothes and stand upright for all the measurements. Waist circumference was measured by placing the measuring tape between the iliac crest and last rib at the level same as umbilicus. Soft tissues were not compressed while taking

any measurements. Waist circumference divided by hip circumference gave the waist hip ratio. Men with WHR ≥ 1.0 and women with WHR ≥ 0.85 were regarded as obese. Waist circumference of ≥ 102 cm for men and ≥ 88 cm for women were taken as obesity. Trained personnel obtained 5 ml of blood from the antecubital vein under complete aseptic condition. This blood was used to estimate the levels of cholesterol and high density lipoprotein. Body mass index of the subjects was calculated using a standardised formula of weight divided by height in square meters. All the recordings were done in a predesigned and pretested proforma. The data thus obtained was arranged in a tabulated form and analysed using SPSS software. Chi square and student t test were used as a test of significance. P value of less than 0.05 was considered significant.

Table 1: Socio-demographic distribution and risk factors for obesity

VARIABLE	SUBGROUP	Non obese		Obese		Total N (400)	P VALUE
		N = 230	%	N = 170	%		
GENDER	Males	94	40.9	66	38.8	160	>0.05
	Females	136	59.1	104	61.2	240	
MARTIAL STATUS	Married	161	70	91	53.5	252	>0.05
	Unmarried	69	30	79	46.5	148	
PAID WORK	Yes	152	66.1	58	34.1	210	<0.05
	No	78	33.9	112	65.9	190	
SOCIOECONOMIC STATUS	Upper class	87	37.8	44	25.8	131	>0.05
	Middle class	81	35.2	71	41.8	152	
	Lower class	62	26.9	55	32.4	117	
REGULAR PHYSICAL ACTIVITY	Yes	168	73.1	27	15.9	195	<0.05
	No	62	26.9	143	84.1	205	

Table 2: The mean value of variables amongst study group

VARIABLE	TOTAL	OBESE	NON OBESE	P VALUE
BODY MASS INDEX (kg/m ²)	26.64 +/-4.22	29.61 +/- 2.12	23.15 +/- 2.12	<0.05
WAIST CIRCUMFERENCE (cm)	82.1 +/- 6.6	94.1 +/- 7.2	73.5 +/-5.3	<0.05
HIP CIRCUMFERENCE (cm)	94.6 +/-3.9	106.3 +/-5.25	94.3 +/-6.1	<0.05
WAIST TO HIP RATIO	0.90 +/- 0.05	0.85 +/- 0.02	0.82 +/- 0.11	<0.05
TOTAL CHOLESTEROL (mmol/L)	5.24 +/- 0.48	6.12 +/- 1.46	5.26 +/- 3.32	>0.05
HIGH DENSITY LIPOPROTEIN (mmol/L)	1.39 +/-0.32	1.27 +/-0.44	1.48 +/- 0.26	<0.05

Graph 1: Age wise Distribution of Patients

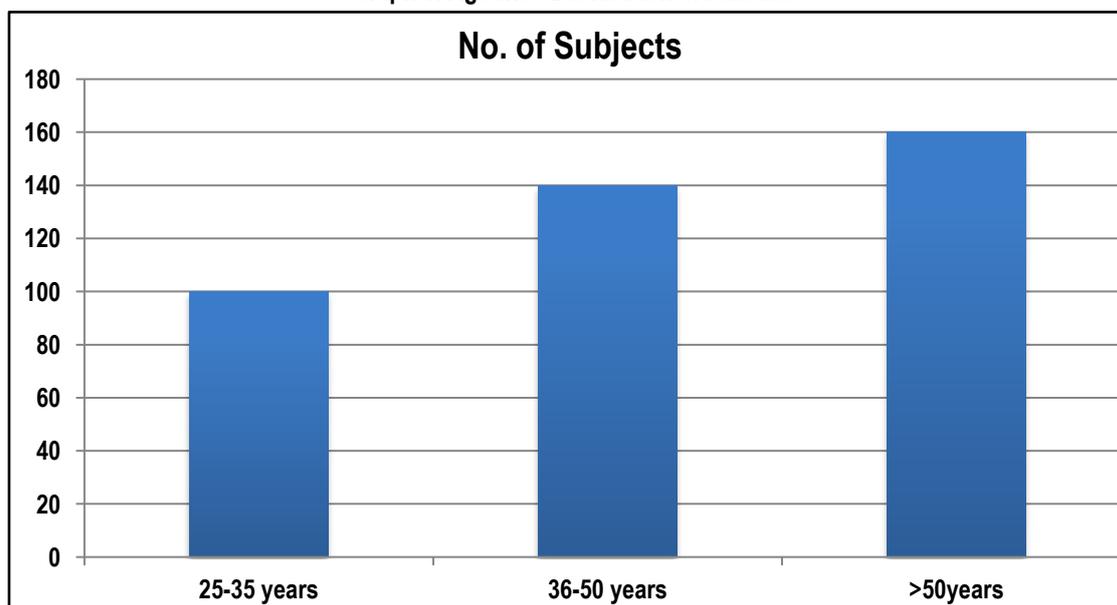


Table 3: Prevalence of obesity

VARIABLE(age)	NUMBER / %	P VALUE
20-35 (n=100)	50/50%	<0.05
36-50(n=140)	55/39.2%	
>51(n=160)	58/36.2%	

RESULTS

A total of 400 subjects were enrolled in the study, out of these, 230 were non obese and 170 were obese. Table 1 shows the socio demographic data of the subjects enrolled in the study. There were 40.9% males and 59.1% females who were non obese. The rest 66 males and 104 females were obese. Amongst 252 married subjects, 161 were non obese and 91 were obese. There were 148 subjects who were unmarried, out of them 69 were non obese and 79 were obese. There was no significant difference of marital status and gender on the incidence of obesity. More of the subjects having paid work were non obese as compared to those who didn't had any paid work. There were 131 subjects who belonged to upper class; out of there 25.8% were obese. There were 152 subjects in middle class and amongst them 37.8% were non obese. In lower class, 26.9% were non obese and 32.4% were obese. There was a significant effect of physical activity on the incidence of obesity. 73.1% subjects who did regular physical activity were non obese compared to 84.1% subjects who didn't do any physical activity and were obese.

Table 2 denotes the difference in values of various variables used for assessment of obesity. The mean BMI amongst the subjects was 26.64 +/-4.22. Amongst obese subjects, the BMI was 29.61 +/- 2.12 and non-obese subjects it was 23.15 +/- 2.12. There was a significant difference in BMI amongst obese and non-obese subjects. The mean waist circumference amongst obese and non-obese subjects was 94.1 +/- 7.2 and 73.5 +/-5.3 respectively. There was a significant difference in the waist circumference amongst both the groups. Hip circumference also showed significant difference amongst obese and non-obese subjects. The mean total was 94.6 +/-3.9 in the study. The waist to hip ratio amongst obese and non-obese subjects was 0.85 +/- 0.02 and 0.82 +/- 0.11 respectively. There was a significant difference amongst obese and non-obese subjects. There was no significant difference in the total cholesterol level between the subjects. The mean value of total cholesterol in the study was 5.24 +/- 0.48. The value of high density lipoprotein varies significantly amongst obese and non-obese subjects.

Table 3 denoted the prevalence of obesity. There were 100 subjects who were between 20-35 years of age, out of these 50 were obese i.e. 50%. There were 140 subjects who were aged between 36-50 years and amongst them 39.2% were obese. Amongst subjects who were more than 51 years of age, there were 36.2% (n=58) who were obese. On applying chi square test there was significant difference in the prevalence of obesity amongst different age group.

DISCUSSION

Developing countries are most vulnerable to the epidemic of obesity worldwide.^{9,10} In low income countries, the most common subjects affected are urban women and women residing in wealthy areas of the nation. Amongst developed nations both sexes are equally affected but there is increased prevalence

amongst disadvantaged group. As per our study, there were 40.9% males and 59.1% females who were non obese. The rest 66 males and 104 females were obese. Amongst 252 married subjects, 161 were non obese and 91 were obese. There were 148 subjects who were unmarried, out of them 69 were non-obese and 79 were obese. There was no significant difference of marital status and gender on the incidence of obesity. There was a significant effect of physical activity on the incidence of obesity. 73.1% subjects who did regular physical activity were non obese compared to 84.1% subjects who didn't do any physical activity and were obese. The prevalence of obesity in the Eastern Mediterranean Region is 25-82%. Various risk factors associated with obesity are modernisation with sedentary lifestyle, uptake of processed food, intake of sugary drinks, decrease in breast feeding duration etc.^{12,13} In our study, there were 100 subjects who were between 20-35 years of age, out of these 50 were obese i.e. 50%. There were 140 subjects who were aged between 36-50 years and amongst them 39.2% were obese. Amongst subjects who were more than 51 years of age, there were 36.2% (n=58) who were obese. On applying chi square test there was significant difference in the prevalence of obesity amongst different age group.

In a study conducted by Erem C amongst Turkish subjects, 43% subjects above 40 years of age were obese. In their study there was a significant association between age, smoking status, income and physical activity with obesity.¹⁴ According to a study conducted by Hajian-Tilaki KO et al amongst school children of Iran there were 5.8% subjects between 7-12 years of age who were overweight and 12.3% subjects were obese. There was a lower incidence of obesity amongst girls compared to boys.¹⁵ According to a study by Chew WF et al, there were 40% of the subjects who were obese and the levels of high density lipoprotein was markedly low amongst obese subjects compared to non-obese subjects.¹⁶ In our study, the mean BMI amongst the subjects was 26.64 +/-4.22. Amongst obese subjects, the BMI was 29.61 +/- 2.12 and non-obese subjects it was 23.15 +/- 2.12. There was a significant difference in BMI amongst obese and non-obese subjects. The mean waist circumference amongst obese and non-obese subjects was 94.1 +/- 7.2 and 73.5 +/-5.3 respectively. There was a significant difference in the waist circumference amongst both the groups. Hip circumference also showed significant difference amongst obese and non-obese subjects. The mean total was 94.6 +/-3.9 in the study. The waist to hip ratio amongst obese and non-obese subjects was 0.85 +/- 0.02 and 0.82 +/- 0.11 respectively. There was a significant difference amongst obese and non-obese subjects. There was no significant difference in the total cholesterol level between the subjects. The mean value of total cholesterol in the study was 5.24 +/- 0.48. The value of high density lipoprotein varies significantly amongst obese and non-obese subjects. As per a study by Chew WF et al¹⁶ the prevalence of obesity was maximum amongst 22-33 years of age. Few limitations associated with the present study were lack of blood glucose and blood pressure estimation. Smaller sample size was selected. There was no association established between obesity and chronic diseases.

CONCLUSION

Prevalence of obesity is increasing at a tremendous rate. In the present study also it was highly prevalent. There was significant

affect of physical activity on the obesity incidence. Levels of cholesterol were also high amongst obese subjects. It was more amongst females than males but the difference was not significant.

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