ASSOCIATION OF LOW PHYSICAL ACTIVITY WITH HIGH BODY MASS INDEX IN BOTH GENDERS

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Body

Abstract

OBJECTIVE: To compare the association of low physical activity with high body mass index (BMI) in both genders at divisional headquarter Hospital Mirpur.

METHODOLOGY: This prospective open label study was conducted from 01-01-202 to 31-12-2012 on 179 consecutive patients at cardiology OPD DHQ Teaching Hospital Mohiuddin Islamic College Azad Kashmir. Data regarding age sex BMI physical activity diabetes hypertension smoking and hypercholesterolemia were collected and analysis by SPSS 16.0.

RESULTS: Mean age was 56.17+13.591 years. Out of 179 individuals 53(29.6%) were over-weight (males=24/66; 36.4% and females 29/113; 25.7%) while 49(27.4%) were obese (male=16/66; 24.2% and females=33/113; 29.2%). Overall sedentary life style was prevalent and 105 (58.7%) subjects were having no or low physical activity in routine daily life. Medium physical activity was observed in 34.8% of male and 39.8% of female subjects (pgreater than 0.05). Mean BMI was 26.865.46 (26.945.843 in males and 26.825.250 in females; pgreater than 0.05). Mean BMI was 28.40+5.684 27.10+4.791 and 26.17+4.697 in subjects with no physical activity low physical activity and medium physical activity respectively (pless than 0.001). Lack of physical activity was significantly associated with high BMI. Pearson correlation was 0.275 for BMI and physical activity (pless than 0.01). Out of 105 subjects having no or low physical activity 66 (62.9%) were having above normal BMI.

CONCLUSIONS: Low physical activity can lead to obesity in both genders and there is no difference in terms of genders. Physical activity should be encouraged in both genders to avoid obesity related complications. BMI should be measured routinely particularly in sedentary and physically inactive individuals.

KEY WORDS: BMI Body Mass Index Physical Activity.

INTRODUCTION

Obesity is a global problem and its prevalence has almost doubled since 1980.1 However different regions of the world are showing variation in the prevalence rates of obesity. Obesity is more prevalent in the Pacific Islands Europe and North America; variable prevalence in Africa and Middle East and least prevalent in Asia.2

World Health Organization (WHO) has developed WHO Global InfoBase" for collecting data on chronic diseases and their risk factors for all WHO member states. One of its indicators is Body Mass Index (BMI).3 In 2008 over 1.4 billion adults were overweight and more than 200 million men and about 300 million women were obese.1 According to WHO estimates obesity is present in 1.9% of Indian population more prevalent among females (2.4%) than males (1.3%).4 In Pakistan one in four individuals is either overweight or obese.5

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Overweight and obesity are defined by using various anthropometric measurements like body mass index (BMI) waist circumference and waistto-hip ratio.6 WHO used BMI to classify overweight (BMI greater than 25) and obesity (BMI greater than 30) in adults.1 The experts proposed a lower cutoff values of BMI for the definitions of overweight (23.024.9kg/ m2) and obesity (greater than 25.0 kg/m2) in Asian population78 However WHO expert consultation concluded that although selective high risk Asians are at increased risk of developing type 2 diabetes and cardiovascular diseases at BMI lower than WHO cut off value however the existing data is not suggestive of any cut-off point of BMI for overweight or obesity in Asian population. Hence WHO expert consultation recommended retaining the existing BMI cut off values for obesity and overweight classification.

Raised BMI is an important risk factor for major cardiovascular diseases (heart disease and stroke) and diabetes.10-12 BMI is a simple inexpensive and noninvasive tool that serves as surrogate measure of body fat as it measures excess weight rather than excess fat. Various factors like age sex ethnicity and muscle mass can alter the relationship between BMI and body fat. 13 Studies have shown an association of low physical activity and body mass index.14-16 Low physical activity has been shown to increase atherosclerotic coronary heart disease and has been recognized as emerging risk factors This has been shown that physical activity reduces genetic predisposition to the obesity and also shown to reduce the mortality. Local data from Pakistani studies is also suggestive of high prevalence of obesity and BMI with sedentary lifestyle.17-20. However data on physical activity and BMI is lacking in Azad Kashmir.

We conducted this study to compare the association of low physical activity with high body mass index (BMI) in both genders at divisional headquarter Hospital Mirpur.

METHODOLOGY

This was an open label non-randomized prospective study of one-year duration from 1st Jan to 31 Dec 2012 conducted at cardiology department outdoor at DHQ teaching hospital Mirpur involving 180 consecutive patients using special BMI calculator Gadget 2007 model.

Inclusion criteria included both genders patients who gave consent and above 20yrs of age.

Exclusion criteria included:

 Patients with psychiatric disturbances and not able to give consent

 Patients receiving steroids therapy oral contraceptive pill

 Pregnancy

Subjects were classified according to WHO international classification1 as underweight (BMIless than 18.5) normal (BMI 18.5 to 24.9) overweight (BMI 25.0 to 29.9) and obese (BMI 30.0 and above).

Azad Kashmir G-power was used for sample size estimation and independent sample t test was used to compare body mass index between two groups; one group of males and another group of females. Data were collected on a predesigned proforma and analyzed by using SPSS version 16. Mean and standard deviation were calculated for quantitative variables and frequencies were estimated for qualitative variables. P-value was considered significant at less than 0.05.

Confounding factors like age social economic status ethnic background and smoking were controlled using logistic regression method. Confounding factors were controlled by including low socio economic groups non smokers only patients of Kashmiri origin were considered who traditionally take less dairy products and less fatty food.

RESULTS

Out of 179 subjects there were 66 males and 113 females ranging in age from 20 to 84 years with a mean age of 53.1311.975 years. Mean age was 56.1713.591 years and 51.3510.587 years in male and female subjects respectively.

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Majority of subjects (n=68/179; 38.0%) were having normal BMI while majority (36.4%) of males were overweight and majority (39.8%) of females were having normal BMI. Overall 27.4% of subjects were obese; 24.2% of males and 29.2% of females were also obese (Table 1).

Overall sedentary life style was prevalent and 105/179 (58.7%) subjects were having no or low physical activity in routine daily life. Medium physical activity was observed in 34.8% of male and

TABLE 1: BODY MASS INDEX (BMI) IN MALE AND FEMALE SUBJECTS

BODY MASS INDEX (BMI)		Gender		Total	P value (Fisher's Exact Test)
		Male	Female		
BMI Below Normal	Count	1	6	7	
	% within Gender	1.5%	5.3%	3.9%	
Normal	Count	23	45	68	
	% within Gender	34.8%	39.8%	38.0%	
Over Weight	Count	24	29	53	
	% within Gender	36.4%	25.7%	29.6%	greater than 0.05
Obese	Count	16	33	49	
	% within Gender	24.2%	29.2%	27.4%	
Machine Error	Count	2	0	2	
	% within Gender	3.0%	0.0%	1.1%	
Total	Count	66	113	179	
	% within Gender	100.0%	100.0%	100.0%	

TABLE I1: PHYSICAL ACTIVITY IN MALE AND FEMALE SUBJECTS

Activity		Gender		Total	P value (Fisher's Exact Test)
		Male	Female		
No Physical Activity	Count	19	32	51	
	% within Gender	28.8%	28.3%	28.5%	
Low Physical Activity	Count	21	33	54	
	% within Gender	31.8%	29.2%	30.2%	
Medium Physical Activity	Count	23	45	68	
	% within Gender	34.8%	39.8%	38.0%	greater than 0.05
High Physical Activity	Count	2	3	5	
	% within Gender	3.0%	2.7%	2.8%	
Very High Physi-cal Activity	Count	1	0	1	
	% within Gender	1.5%	0.0%	0.6%	

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Count	66	113	179 Total
% within Gender	100.0%	100.0%	100.0%

TABLE II1: CROSS TABULATION OF BODY MASS INDEX (BMI) WITH PHYSICAL ACTIVITY

Physical Activity		BMI Below Normal	Normal	Over Weight	Obese	Machine Error	BMI Total	P value (Fisher's Exact Test)
No Physical Activity	Count	1	18	11	21	0	51	
	% within BMI	14.3%	26.5%	20.8%	42.9%	0.0%	28.5%	
Low Physical Activity	Count	2	17	24	10	1	54	
	% within BMI	28.6%	25.0%	45.3%	20.4%	50.0%	30.2%	
Medium Physical Activity	Count	1	32	17	18	0	68	
	% within BMI	14.3%	47.1%	32.1%	36.7%	0.0%	38.0%	less than 0.001
High Physical Activity	Count	3	1	1	0	0	5	
	% within BMI	42.9%	1.5%	1.9%	0.0%	0.0%	2.8%	
Very High Physical Activity	Count	0	0	0	0	1	1	
	% within BMI	0.0%	0.0%	0.0%	0.0%	50.0%	0.6%	
Total	Count	7	68	53	49	2	179	
	% within BMI	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

TABLE 1V: CORRELATION OF BODY MASS INDEX WITH PHYSICAL ACTIVITY

Correlation of BMI and Physical activity		BMI	Activity
BMI	Pearson Correlation	1	-.275
	Sig. (2-tailed)		.000
	N	179	179
Physical Activity	Pearson Correlation	-.275	1
	Sig. (2-tailed)	.000	
	N	179	179

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TABLE V: CROSS TABULATION OF DIABETES MELLITUS HYPERTENSION SMOKING AND HYPER-CHOLES-TEROLEMIA WITH BODY MASS INDEX

		BODY MASS INDEX				Machine Error (n=2)	Total (n=179)
		BMI Below Normal (n=7)	Normal (n=68)	Over Weight (n=53)	Obese (n=49)		
Diabetes mellitus	Yes	6 / 85.7%	58 / 85.3%	45 / 84.9%	33 / 67.3%	1 / 50.0%	143 / 79.9%
	No	1 / 14.3%	10 / 14.7%	8 / 15.1%	16 / 32.7%	1 / 50.0%	36 / 20.1%
Hypertension	Yes	4 / 57.1%	48 / 70.6%	37 / 69.8%	30 / 61.2%	1 / 50.0%	120 / 67.0%
	No	3 / 42.9%	20 / 29.4%	16 / 30.2%	19 / 38.8%	1 / 50.0%	59 / 33.0%
Smoking	Yes	2 / 28.6%	1 / 1.5%	3 / 5.7%	1 / 2.0%	0 / 0.0%	7 / 3.9%
	No	5 / 71.4%	67 / 98.5%	50 / 94.3%	48 / 98.0%	2 / 100.0%	172 / 96.1%
Hyper-cholesterolemia	Yes	3 / 42.9%	14 / 20.6%	17 / 32.1%	18 / 36.7%	1 / 50.0%	53 / 29.6%
	No	4 / 57.1%	54 / 79.4%	36 / 67.9%	31 / 63.3%	1 / 50.0%	126 / 70.4%

39.8% of female subjects. Only 3.4% had high or very high physical activity (Table II).

Overall mean BMI was 26.865.46. In male subjects mean BM I was 26.945.843 while in females the mean BMI was 26.825.250. Lack of physical activity was significantly associated with high BMI. Out of 105 subjects having no or

low physical activity 66 (62.9%) were having above normal BMI (Table III). Mean BMI was 28.40+5.684 27.10+4.791 and 26.17+4.697 in subjects with no physical activity low physical activity and medium physical activity respectively.

Increased physical activity has a significant strong negative association with BMI (Table IV) and it is evident from scatter plot that with decline in the physical activity BMI increases (figure 1).

Diabetes mellitus (n=143; 79.9%) hypertension (n=120; 67%) smoking (n=7; 3.9%) and hypercholesterolemia (n=53; 29.6%) were observed in these subjects. In obese patients diabetes was present in 67.3% cases Hypertension in 61.2% cases hyper-cholesterolemia in 36.7% cases and smoking in only 2% cases (Table V).

DISCUSSION

Our study clearly showed that low level of physical activity is significantly associated with high body mass index which have cardiovascular mortality and morbidity implications. Low physical activity should be discouraged from childhood as metabolic syndrome is being increasingly recognized at pediatric age[2122] both parents and teachers and more community role will be required in this regards. Low physical activity is increasingly being seen as emerging risk factor for development of atherosclerotic coronary artery disease. High mortality has been reported with both overweight and obese patients.[23] Our study is first in the region of Azad Jammu and Kashmir suggesting the magnitude of the problem. A very large frequency of diabetes and Hypertension was another important observation in our study.

According to American Heart Association Guidelines Body mass index is useful parameter to assess obesity with different techniques having Both advantages and disadvantages.[24] Physical activity in our study was classified Into sedentary light moderate vigorous and high. In our study lack of physical activity was significantly associated with high BMI. This finding is favoring other international studies that physical inactivity is associated with obesity and raised BMI.[25-30] Other studies from Pakistan also showed a higher prevalence of physical inactivity in obese individuals.[3132]

In our study males (36.4%) were more over weight as compared to females (25.7%). However more females were (29.2%) were obese as compared to males (24.2%). However this difference was not significant. Studies have shown that obesity is relatively more common in females with race and income as stronger risk factors for obesity in females.[33] However the associations of obesity with gender age ethnicity and socioeconomic status are very complex and cannot be oversimplified.[34] Our study showed that low physical activity can lead to obesity in both genders and there is no difference in terms of genders.

Fighting obesity and metabolic syndrome needs to target it from childhood and adolescent levels and measure BMI even at school age to identify the persons and to make an effective strategy. One such strategy was set by New York State department of health for prevention of overweight and obesity. The goals were set to increase the awareness of overweight and obesity as a major public health threat and increase early recognition of overweight and/or excessive weight gain. Apart from need to improve the management obesity and related diseases it was emphasized to improve the eating habits and increase the lifelong physical activity. An important goal was set to decrease the exposure to television and other recreational screen time.[35]

Obesity is a major cause on non-communicable diseases and is very common in Pakistan. Unhealthy foods are one of the causes of increased obesity in our country as Pakistani foods are energy dense". The lack of physical activity and changing life styles are main contributing factors towards rapidly growing prevalence rates of obesity in Pakistan.[32]

WHO has developed a global strategy to promote and protect health by suggesting sustainable actions at individual community national and global levels to reduce disease and death rates related to unhealthy diet and physical inactivity.[36] Unfortunately Pakistan is lacking a national strategy to wrestle the obesity and we need to develop a national policy to promote physical activity in Pakistan.

Study limitations

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We could not measure physical activity level using specially designed gauge accelerometer Due to non availability of this gadget. Cost of gadget is very high and is available only in big cities.

CONCLUSIONS

Low physical activity can lead to obesity in both genders and there is no difference in terms of genders. Physical activity should be encouraged in both genders to avoid obesity related complications. BMI should be measured routinely particularly in sedentary and physically inactive individuals to recognize obesity and metabolic syndrome early and take preventive measures and prompt intervention in both genders.

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AUTHOR'S CONTRIBUTION

The sole author (RA) has made substantial contributions to the manuscript in conception and design acquisition of data drafting the manuscript and final approval of the version to be published. Author agrees to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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