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Research Article

**STUDY TO KNOW RELATIONSHIP BETWEEN OBESITY
AND HIGH BLOOD PRESSURE IN SCHOOL GOING
CHILDREN OF LAHORE**

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Abstract:

Objective: To assess the relationship between obesity and high blood pressure (BP) risk in adolescents Lahore City.

Study Design: A stratified random sampling technique.

Place and Duration: The study was conducted for one year duration from September 2018 to August 2019 in the School going children of Lahore attending the Pediatrics OPDs of Children hospital, Services Hospital and Jinnah Hospital of Lahore City.

Methodology: A multi-stage stratified random sampling technique was used to represent a sample of 661 adolescents aged 12-17 years.

Findings: In males the mean BMI was greater than females of all ages, with the mean BMI (24.1 kg / m²) of females out of 13 years being higher than females. Men (22.0 kg / m²) had increase systolic blood pressure (SBP) (118.1 mm Hg - 127.1 mm Hg) than males (110.2 mmHg - 117.1 mmHg). The high SBP prevalence raised with increasing weight, because 51% of men with increased SBP were overweight, 62.5% of women. Similarly, it was more obese when compared to DBP in the normal range twice (IC 95% 1.1, 4.4) and four times (IC 95 1.6%, 8.5) in patients with high diastolic blood pressure (DBP).

Conclusion: The obesity prevalence in Pakistani adolescents and the association of high blood pressure in this age group requires urgent action to prevent and control obesity.

Key words: Body mass index, Adolescents, obesity, blood pressure.

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INTRODUCTION:

Changes in lifestyle is major cause of obesity and overweight. The global prevalence of obesity and is an important factor that almost all populations and age groups suffered worldwide. This is especially true in Asian countries where traditional grades have experienced a gradual change from western food to fatty wines or carbohydrates characterized by a high energy intake. In addition, the resident lifestyle of the majority of the population leads to the obesity living in this region. Obesity in adolescent and Childhood is a major public health issue and World Health Organization in 1998 identified obesity affecting adults and children globally and is epidemic. It has been reported that a large proportion of the women with erectile dysfunction are at risk of becoming overweight or overweight, from 33% up to 11 years of age. It has been reported that the international standard for obesity prevalence among young Pakistanis is two to three times higher than that and have serious effects on health of population, such as chronic diseases prevalence in adults. Studies of obesity in Indian children have shown that blood pressure (BP) and biochemical variables are affected negatively in obese children. Assessing the incidence of hypertension among Indian children, one study found that 62.0% of hypertensive patients were overweight and leads to hypertension in the most common children. In Bahrain, body mass index (BMI) and body fat have been reported to be significantly and positively associated with high blood pressure risk in both adolescents and women.

MATERIALS AND METHODS:

This stratified random sampling technique study was continue for one year duration from September 2018 to August 2019 in the School going children of Lahore attending the Pediatrics OPD of various Hospitals including Children hospital, Jinnah Hospital and Services hospital, Lahore. An example of these young people (661) adolescents,

(337 females and 324 males) were selected using a multi-stage stratified random sampling technique. All parents, teachers and adolescents were clearly informed about the content of the study and its purpose and written approval of their parents was taken. The height and weight were recorded as by Gibson instructions. The weight was recorded very precisely to 0.1 kg using a portable electronic scale (Seca). To fortify the measurement accuracy, zero readings were verified before each weighing and each data collection was calibrated to a known weight in the morning. The height of the volunteers was measured in standing position with a proximity of approximately 0.1 cm with portable stadiometer. The students were asked to stand on their shoes and socks, with their backs, with their heels and heads standing upright. An automatic BP monitor was used for BP. According to the World Health Organization expert committee on the control of hypertension recommendations the BP status of adolescents is defined. Linear regression, Spearman's correlations, odds and coefficient ratio were used to record the association between adolescent blood pressure and obesity. Using SPSS version 16.0 data was analysed. The weight was evaluated as low weight using the cut-off values of BMI nominate by the WHO: BMI <5. percentage; normal weight: from BMI to <85 for age from 5th percentile; Overweight: from the 95th percentile of BMI for age and obesity from the 85th percentile: e "95th percentile of BMI for age.

RESULTS:

The median, mean and S.D of SBP, DBP and BMI by sex and age are given in Table-I. In males, BMI mean was low in 14 years (21.9 kg / m²) and the highest in 14 years (23.6 kg / m²). The lowest mean BMI in women was 12 years (19.8 kg / m²) and the highest was 13 (24.1 kg / m²). Male adolescents had increase systolic blood pressure (118.2 mm Hg - 127.0 mm Hg) than female adolescents (110.0 mm Hg - 117.2 mm Hg).

Table-I: Means, medians, and standard deviation of body mass index and blood pressure.

Age (years)		Males			Females				
		N	BMI (kg/m ²)	Systolic BP	Diastolic BP	N	BMI (kg/m ²)	Systolic BP	Diastolic BP
12	Mean	37	22.6	117.3	74.8	15	19.8	109.2	71.0
	Median		22.0	116.5	77.0		18.6	107.5	69.5
	S D		5.3	15.0	11.1		4.6	13.1	10.6
13	Mean	59	21.9	117.2	74.2	65	24.1	116.6	74.5
	Median		20.3	116.5	75.0		23.3	116.0	74.0
	S D		5.8	11.2	9.2		7.0	14.8	8.6
14	Mean	82	23.6	121.6	74.7	67	23.1	115.6	75.5
	Median		21.2	119.8	74.5		21.0	117.0	75.0
	S D		7.5	14.4	9.5		6.4	13.3	8.9
15	Mean	51	23.0	122.4	74.2	64	22.6	112.2	73.5
	Median		21.5	120.5	74.5		20.6	112.0	72.8
	S D		5.6	15.2	8.9		6.0	11.7	9.5
16	Mean	47	23.1	123.5	75.2	63	23.0	117.2	74.2
	Median		22.1	122.5	74.0		20.9	116.0	74.0
	S D		4.4	13.4	9.0		6.6	11.4	8.4
17	Mean	48	23.2	126.8	74.1	63	22.7	115.0	72.8
	Median		20.8	126.6	72.8		20.8	115.0	73.0
	S D		5.5	12.4	10.6		5.7	11.1	8.2

DBP varies from 71.0 to 75.5 mmHg in women and from 74.1 to 75.2 mm Hg in men. SBP and DBP were 17 men with high PAS (126.8 mmHg) and lowest PAD (74.1 mmHg) while women were 12 years (109.2 and 71.0 mmHg) lower than women. The adolescents proportion with Obesity according to the BMI given in Table II.

	Males (M) (BMI)								P- value*	Females (F) (BMI)								P value*
	Under weight		Normal weight		Over weight		Obese			Under weight		Normal weight		Over weight		Obese		
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%	
Blood Pressure																		
Systolic BP																		
Normal	14	5.0	166	59.3	50	17.9	50	17.9	0.000	18	5.6	204	63.6	40	12.5	59	18.4	0.000
High	0	0.0	12	27.3	10	22.7	22	50.0		0	0.0	2	12.5	4	25.0	10	62.5	
Diastolic BP																		
Normal	14	4.9	161	56.9	55	19.4	53	18.7	0.001	17	5.5	197	63.5	39	12.6	57	18.4	0.005
High	0	0.0	17	41.5	5	12.2	19	46.3		1	3.7	9	33.3	5	18.5	12	44.4	

* P-value for Chi-square

In both sexes, SBP was found higher in obese (63.1% of females and 51.0% of males). The relationship between SBP and weight status was significant statistically (p less than 0.000 for both males and females). However, DBP was also found in normal-weight young people. The relationship between weight status and DBP was significant statistically (p less than 0.005 and p less than 0.001, respectively for male and female). The risk of B.P according to weight status in adolescents is given in Table III.

	Males						Females					
	Non-obese <85 th P		Overweight & Obese >85 th P		Odds Ratio	P Value	Non-obese <85 th P		Overweight & Obese >85 th P		Odds & Ratio	P Value
	n	%	n	%			n	%	n	%		
Systolic BP												
Normal	180	64.3	100	35.7	1.0	0.000	222	69.2	99	30.8	1.0	0.000
High	12	27.3	32	72.7	4.8 (2.3-9.7)		2	12.5	14	87.5	15.6(3.5-17.3)	
Diastolic BP												
Normal	175	61.8	108	38.2	1.0	0.013	214	69.0	96	31.0	1.0	0.001
High	17	41.5	24	58.5	2.0(1.1-4.4)		10	37.0	17	63.0	3.7(1.6-8.5)	

To achieve the odds, adolescents are divided into 2 categories as non-obese (low-overweight and normal-weight teenagers) and obese (obese and overweight adolescents). The risk of high SBP in obese and overweight male adolescents is about five times higher among adolescents of both sexes. Regarding BPD, the risk was 2.2 and 3.7 times for men and women respectively.

DISCUSSION:

In the last decade, the increase in tension in adolescents and children has rise, and results suggests that 65-75% of increase weight gain may be the cause of essential hypertension. This study shows that obese adolescents has SBP and BPD significantly higher than non-obese adolescents, and confirm previous observations of increased BMI in adolescents with higher blood pressure. Studying in India during the school age from 12 to 1 years shows a close association between obesity and high blood pressure. In different age groups, SBP had a higher mean number of female and adolescent male adolescents. BP showed differences in age and gender. Similar results have been reported by Dasgupta et al. Compared to women with a high SBP, men have this difference,

but the risk of puberty is likely to increase. In addition, SBP personnel may report hypertension at a higher rate in men than in women in young and middle-aged adults. This study shows that BMI is an important predictor of SBP in men and women in Pakistani adolescents. The lack of physical exercise and high energy consumption in diet is seen as the main factors responsible for fat accumulation in children in Asian countries. Because of the increased renal tubular reabsorption of sodium, natriuresis, abnormal renal pressure, obesity, hypertension is an important factor. In another study reported children in adults with hyperactivity factors, including a functional abnormality and insulin resistance, which can be associated with sympathetic nervous system (SNS), vascular structure and obesity, hypertension

contributed to adults. . BP levels in children and adolescents do not seem to be related to the outcome of the disease unless they are extremely high. However, current data suggest that adult diabetes and cardiovascular diseases increase the risk of hypertension and obesity at this age. Researchers found that adult obesity is related with high risk of coronary heart disease morbidity and in adulthood associated with atherosclerosis, regardless of overweight in adolescence. In childhood, Obesity should be taken as a chronic medical condition and therefore long-term treatment will be necessary. Public health initiatives may be useful to stop the pediatric obesity pandemic and its complications.

CONCLUSION:

As a result, this study shows that obesity in men is higher than women and that puberty is longer than pubescent. For this reason, the BMI levels used to describe non-obese and obese persons which have relationship between high blood pressure, body mass index and other health-related characteristics. This is even more important as the obesity prevalence has been reported among school children in Pakistan.

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