

Systolic Blood Pressure Among Overweight and Obese Male Students in High schools in Al Madinah Al Munawwarah 2012

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ABSTRACT:

Background : Hypertension is a major health problem throughout the world because of its high prevalence and its association with increased risk of cardiovascular diseases .Obesity increases the risk of developing high blood pressure. In fact, blood pressure rises as body weight increases.

Objective : To determine the prevalence of systolic hypertension among obese and overweight subjects and its other related risk factors . To determine the prevalence of obesity and overweight among male students in Saudi high schools.

Subjects and methods: A cross-sectional study followed by nested case control was conducted in high schools in Al Madinah Al Munawwarah . we measured age ,weight(by electric weighting machine) and height (by classic meter) for all sample(n=182) ,blood pressure(by mercurial sphygmomanometer) and risk factors of hypertension(by questionnaire) (n=56) . we considered students with prehypertension and hypertension as study cases , and those normal hypertension as study control to assess the risk factors association with hypertension .

Results : Prevalence rates of body weight to 182 students were 1.6% ,starvation, 26.4%underweight, 40.1% ,normal, 15.9% overweight, 15.9% obesity . The prevalence rates of hypertension for 56 students those were overweight and obese were (30.4%) normal blood pressure (53.6%) prehypertension (16%) hypertension. There is a significant relation between body weight and systolic blood pressure that had low p.value as 0.03 and Odd ratio as 3.56 , this is indicate trend association.

Conclusion : Hypertension is considerable complication of obesity and overweight . The related risk factors were age, family history , stress , canned food , salt intake , soft drinks , fast food .

Keywords: Systolic blood pressure, obese Male Students, Al Madinah Al Munawwarah.

INTRODUCTION

Obesity is the disorder of body weight regularity systems characterized by an accumulation of excess body fat [1]. Although powerful physiological mechanisms regulate food intake, there are also important environmental and psychological factors that can cause abnormal feeding behavior, excessive energy intake, and obesity [2] . WHO estimates that, in 2005, more than 1 billion people worldwide were overweight (BMI \geq 25) and more than 300 million were obese (BMI \geq 30). Mean BMI, overweight and obesity are increasing worldwide due to changes in diet and increasing physical inactivity.

WHO discover that in 2008 there were 1.5 billion overweight adults. And about 2.3 billion adults will be overweight and more than 700 million obese by 2015[3]. Based on National Health and Nutrition Examination Survey data, the prevalence of obesity in 2007–2008 was 32.2% [4]. The prevalence of obesity and obesity-related disease is increasing worldwide [5]. 2.8 million adults die each year as a result of being

overweight or obese .Globally, 44% of diabetes burden, 23% of ischaemic heart disease burden and 7–41% of certain cancer burdens are attributable to overweight and obesity [6]. So due to the rising prevalence of obesity in children and its many adverse health effects it is being recognized as a serious public health concern [7] .The prevalence of overweight was (16%) and obesity was (15%) high school students in Georgia, in 2011[8]

Many studies have shown that blood pressure is associated with being overweight in children and adolescents of Western countries [9].Weight gain is associated with increases in arterial pressure, and it has been estimated that 60–70% of hypertension in adults is attributable to adiposity [10]. Being obese causes stress on the body. The heart, joints, arteries and other areas all feel the increased weight of fat, as well as the stress of other factors that come with obesity. The body normally reacts to this type of stress by producing a stress hormone called aldosterone. This hormone causes increased retention of sodium (salt) in the body. The more sodium that's in body tissues, the less likely they are to accept more blood into their cells to deliver nutrients. This can lead to a buildup of blood in the circulatory system, which will in turn lead to high blood pressure, or hypertension [11].

Obesity increases the risk of developing high blood pressure. In fact, blood pressure rises as body weight increases. Losing even 10 pounds can lower blood pressure and losing weight has the biggest effect on those who are overweight and already have hypertension. Blood pressure is the force of blood pushing against the walls of the arteries as the heart pumps out blood [12]. Obese subjects display higher BP levels than non-obese individuals even in the normotensive range [13].

The relationship between obesity and hypertension is well established both in children and adults[14] also Both overall obesity and central obesity were significant predictors of HBP(high blood pressure) in Egyptian adolescents[15]. Obesity was significantly associated with an increase in both systolic and diastolic blood pressure [16,17]. Hypertension might cause atherosclerosis, Aneurysm ,heart failure , kidney dysfunction , eye problem [18] . Children with elevated blood pressure (BP) can develop target organ damage [19]. They are also at increased risk of cardiovascular disease in adulthood [20]. The risk of coronary heart disease is doubled if the body mass index (BMI) is >25 and nearly quadrupled if the index is >29 [21, 22] Hypertension is a major health problem throughout the world because of its high prevalence and its association with increased risk of cardiovascular diseases in the context of the epidemiological transition[23,24]

Among U.S. adolescents, sedentary activities and BMI are positively associated with SBP after adjustment for confounding factors and mediators, while BMI is negatively associated with DBP. If confirmed by further studies, population-based interventions aimed at sedentary activities may be practical approaches to decrease SBP and the risk of obesity among adolescents [25].

In the context of increasing prevalence of obesity in Saudi Arabia , the aim of this study was to assess BP status in obese and overweight male students in high schools, and to determine environmental, social and behavioral (physical activity, perceived stress ,diet type) associated factors.

MATERIALS AND METHODS

Study design

A cross-sectional study followed by nested case control was conducted in high schools in Al Madinah Al Munawwarah, KSA, over a 4-month period from 30 September 2012 - January 2013.

Sample size

A sample size of 182 subjects was calculated on assumption of a 15.8% ,11.7%prevalence of obesity overweight respectively [26]. The sample calculated by this equation ($n=Z^2pq/d^2$).

Study population

The study population included Saudi male adolescents (age 15-21 years), studying in public high schools in Al Madinah Al Munawwarah, KSA . In different areas of the same city three(3) schools were selected (Ibn Hazm Prince Muqrin , Prince Abdul Majeed high schools) to avoid some of the environmental factors ,then by simple random sampling from the lists of students was selected from the population.

Data collection

The study evaluated anthropometric Height and weight then get the BMI then blood pressure for obese and overweight students. Body mass index which is the weight in kilogram divided by the height in meters squared (kg/m²), was calculated for all the study participants.

Instrument

We measured the Weight without shoes by electric weighting machine and the height by classic meter then measure BMI ,Overweight is defined as a BMI 25-29.9 and Obesity is defined as a BMI ≥ 30 . We measured blood pressure of obese and overweight by mercurial sphygmomanometer. We also evaluated Socio-demographic variable (Age, family history of hypertension for obese and overweight students) and lifestyle (physical activity, dietary intake that may affect the blood pressure, stress state, smoking) and medical history of Anti-hypertension medication and other diseases were obtained by a self-administered questionnaire.

Data analysis

Statistical analysis was done with aid of the computer program SPSS (statistical package for the social sciences).

RESULTS

Table 1 distribution and % of study group according to age was divided to groups as younger (≤ 18 equal 88.5%)and adolescents(>18 equal 11.5%).

Table 1.distribution of age (n=182).

Age (year)	Frequency	%
≤ 18	161	88.5
>18	21	11.5
Total	182	100.0

Table 2. distribution of BMI categories among male students (n=182)

Body state	*BMI	Frequency	%
Starvation	<15	3	1.6
underweight	<18.5	48	26.4
Normal	<24.9	73	40.1
Overweight	<29.9	29	15.9
Obesity	>=30	29	15.9
Total		182	100.0

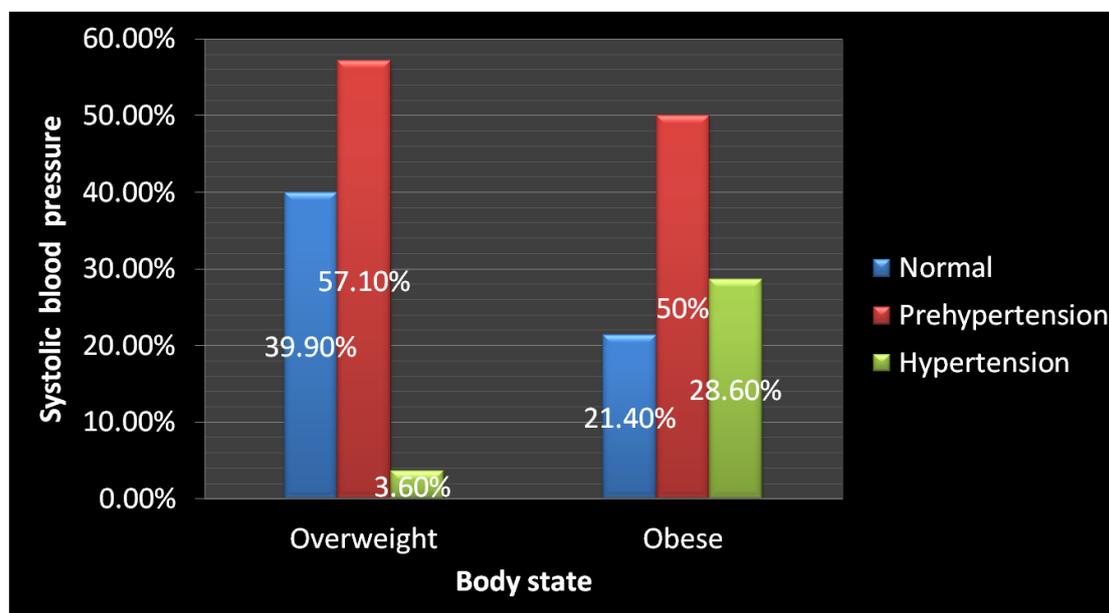
*BMI=Body mass index

In table 2: The normal body weight was 40%, while the prevalence of obesity and overweight was the same (16%).

Table 3. distribution of blood pressure categories among male students (n=56)

Blood pressure	Frequency	%
Normal	17	30.4
Prehypertension	30	53.6
Hypertension	9	16.1
Total	56	100.0

In table 3 and Graph 1: The prevalence rates of hypertension among overweight & obese 9/56 (16%), whereas the prehypertension 30/56 (53.6%).



Graph 1. The prevalence rates of hypertension and prehypertension among overweight & obese (n=56) .

Table 5. Comparison of sociodemographic characteristics between the studied students whose have BMI up than normal (i.e. Overweight and obese) with and without hypertension.

Sociodemographic and lifestyle factors	Cases with higher blood pressure (prehypertensive and hypertensive)		Controls normal blood pressure		P .value
	NO.	%	NO.	%	
Age (years)	45	80.4%	17	19.6%	0.06
Young(=<18)	27	PRE-HTN	5	HTN	
Adolescent(>18)	3	4	13	4	
Family history	39	69.6%	17	30.4%	0.99
Yes	16	5	9		
no	14	4	8		
Smoking status					0.05
Yes	2	3	1		
no	28	6	16		
Body weight					0.03
Overweight	16	1	11		
obesity	14	8	6		
Transient HTN during measurement					0.51
YES		0	1		
NO	2	9	14		
unknown	22	0	2		
Stress					0.9
YES	5	1	3		
NO	25	8	14		
Taken anti-hypertension drugs					constant
Yes	0	0	0		
No	30	9	17		
Food types					0.74
Yes(healthy)	6	1	4		
No (non healthy)	24	8	13		
Drink type					0.95
Yes (healthy)	10	3	5		
No (non healthy)	20	6	12		
Exercise state					0.54
Yes	24	8	11		
No	6	1	6		
Other diseases					0.65
Related to blood pressure	1	1	0		
Not related to blood pressure	2	1	1		
No	27	7	16		

Salts intake				0.82
Yes	9	2	4	
No	19	6	10	
Unknown	2	1	3	

In Table 5. Comparison of sociodemographic characteristics between the studied students whose have BMI up than normal (i.e. Overweight and obese) with and without hypertension the p.value was statistically significant only for body weight.

Table 6. Association between body weight and systolic blood pressure.

Body state	systolic.b.p						Total	*P.value	Odd	95% CI	
	Normal		prehypertension		HTN						
Overweight	11	39.3%	16	57.1%	1	3.6%	28	100. %	0.014	2.86	1.16 - 6.99
obese	6	21.4%	14	50%	8	28.6%	28	100. %			
Total	17	30.4%	30	53.6%	9	16.1%	56	100.0%			

*fissure exact.

Table 6. In Fissure exact p.value was significant 0.01 which indicated differences of body weight (overweight and obese) and systolic blood pressure (normal, pre- and hypertension).

The percentage of hypertension was higher among obese than overweight, and the percentage of prehypertension was higher among overweight than obese. Order logistic regression of BMI with systolic BP was (R) =25% ,so there is positive correlation.

There is a significant relation between body weight and systolic blood pressure that had low p.value as 0.03 and Odd ratio as 3.56 , this is indicate trend association .with every increase of one Kg of weight there is 3.5 times increase of blood pressure from normal to prehypertension and hypertension . With every increase weight of 1 Kg of obese the blood pressure increase by 12.6 times.

DISCUSSION

The prevalence of overweight observed among male adolescents in our study was 15.9% a little difference to a value of 13.8% observed among adolescents in Riyadh 2003, while the prevalence of obesity in our study was 15.9% is lower than the 20.5% among adolescents in Riyadh 2003 [8].

The mean BMI and body weight status. Of the 885 adolescents, 81 (9.2%) were underweight, 122 (13.8%) were overweight and 181 (20.5%) were obese according to the criteria used . While in our study , Of the 182 adolescents, 48 (26.4%) were underweight, 29 (15.9%) were overweight and 29 (15.9%) were obese [8].

The prevalence rates of hypertension among male overweight & obese were 9/56 (16%), where the prehypertension 30/56 (53.6%), While the Prevalence rates of prehypertension and hypertension of other study were 5.7% and 4.0% respectively [27]. Blood pressure was significantly high among adolescents who are obese by BMI (OR=2.18, 95% CI=1.38–3.44) . While in our study it was significant (OR=3.56, 95% CI=1.16–6.99) [28] .

Recommendation:

1. Hypertension screening should be included in a school health program. Follow-up and regular blood pressure measurement should be an important step in school health programs. Waist circumference should be measured in the school clinic. It could be used in a health promotion program to identify individuals who should seek, and be offered, weight management and those at risk of developing hypertension.
2. Prevention of cardiovascular risk factors as early as childhood may be an important strategy to prevent non communicable diseases in a life course perspective, particularly in settings with scarce resources and limited health care capacity. Programs and policies to limit sedentary behaviors and promote physical activity and healthy nutrition among children are recommended.

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