

# THE COMPARISON OF THE INCIDENCE OF HYPERTENSION AND HYPERGLYCEMIA IN CHILDREN WITH NORMAL AND HIGH LEVEL OF BMI

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**Introduction :** Childhood obesity is increasingly growing problem around the world and is one the main causes of developing cardiovascular complication and type 2 diabetic mellitus later in life.

**Aim of the study:** The aim of this study was to determine the prevalence of obesity among school age children in municipality of Diber, and the incidence of hypertension and hyperglycemia among them.

**Material and methods:** Three hundred and eighty- five school age children during the last year were included in this study. Obesity is defined according to the level of BMI, blood pressure through measurement by the mercury sphygmomanometer, while the blood glucose level by the glucose meter.

**Results:** From 385 children included in this study 86 of them (22%) have resulted with overweight. In a group of overweight kids in 15 of them were recorded higher values of arterial pressure (>110/90), and in 9 of them greater value of blood sugar concentration (> 100 mg/dl). In a group of normal weight, totally 299 children only in 5 of them are registered high value of arterial pressure and no one has resulted in high levels of blood glucose

**Conclusion:** According to our study resulted that that hyperglycemia and HTA are most common in obese children than those with normal weight

**Key words:** BMI, overweight , HTA, hyperglycemia



## I INTRODUCTION

High and rising rates of overweight and obesity among children is a worldwide problem. During the last three decades proportion of children who are considered overweight or obese has doubled. Obesity in general, and particularly childhood obesity, has serious adverse consequences in health. Obesity and overweight may causes many health problems which once were characteristic only for adults such as heart disease, high blood pressure, atherosclerosis, diabetes type 2 etc. These are some of

the most common health complications faced by overweight children. As a consequence these children have to cope with chronic illnesses for an unusually extended period of time. On the other hand if this diseases are not diagnosed in time until adulthood it will certainly lead to higher rates of complications and a less healthy life.

## II MATERIAL AND METHODS

A total 385 school children aged from 6 to 14 years were consecutively enrolled in the study. Socio-demographic characteristics of the child include age and

sex. Children were classified according to their Body Mass Index percentile according to the WHO as overweight (BMI $\geq$ 85 ) and normal weigh (BMI< 85).

Obesity was diagnosed by calculating the body mass index by the formula:

$$\frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$

Eighty six children (22 %) included in this study are classified as overweight while 299 as a normal weight.

Blood pressure was measured by a mercury sphygmomanometer while hypertension was defined blood pressure that's the same as or higher than 95 percent of children who are the same sex, age and height, or a measurement of 120/90 mm Hg or greater.

### III Results

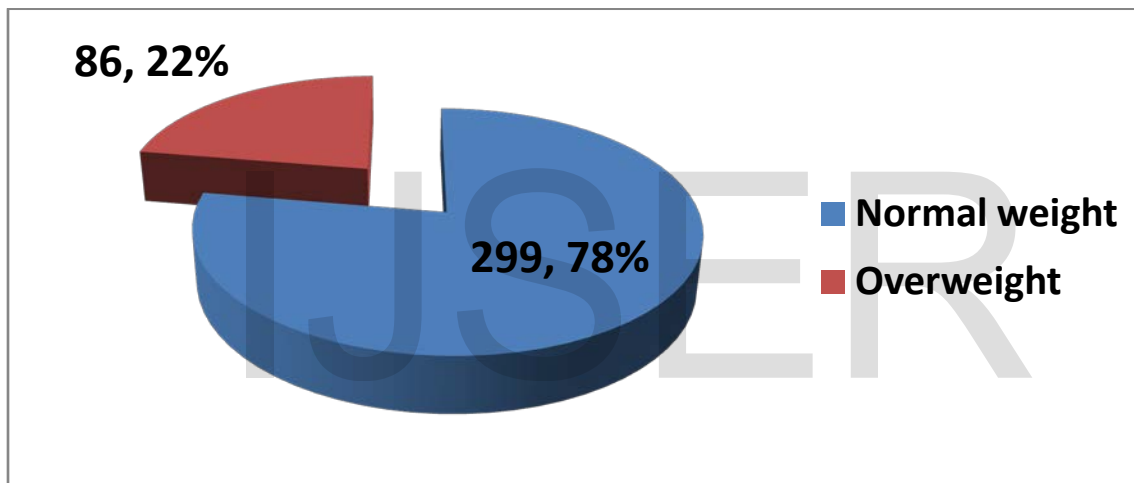
There were almost equal numbers of male and female children included in this study, respectively 181 of them were boys and 204 girls, while their median age was 9.5 years (6 to 15 y) .

Blood sample was taken after cleaning the finger with saline via finger prick. The sugar level was measured using an Glucometer by allowing a drop of blood spot on the glucose stick which is preloaded on the reader.

Socio-demographic characteristics of the child include age and sex.

The characteristics of overweight children were compared with those with normal or underweight in a two table and analyzed if they are statistically significant. A p-value of < 0.05 was considered significant using a 95% confidence interval.

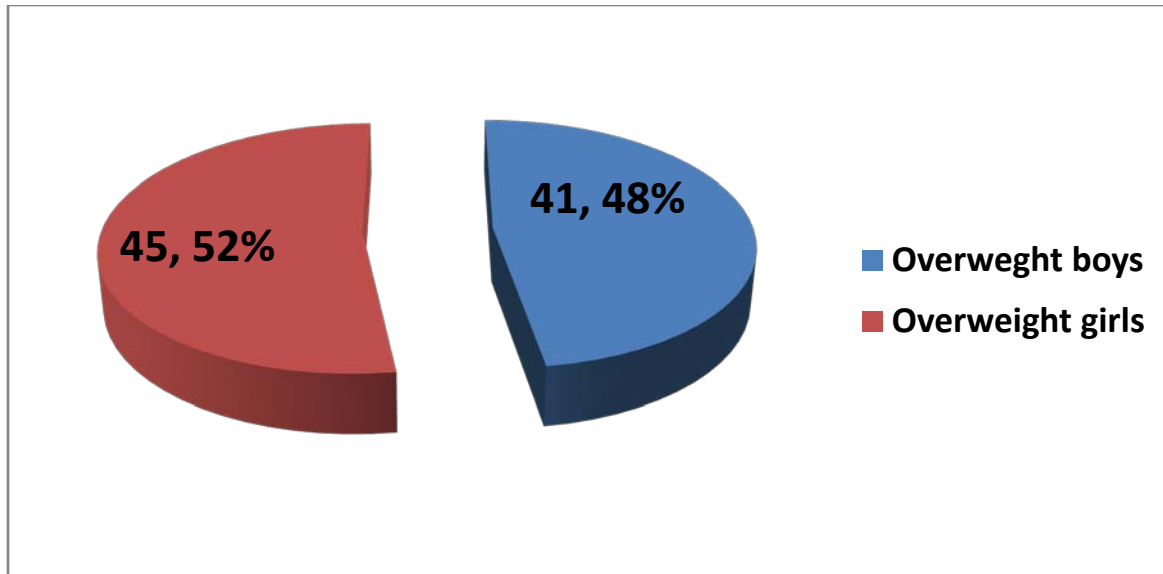
From 385 school age children included in this study the prevalence rates of overweight is about 22.3 % or 86 children out of 385 have a BMI greater than 2.26. Graph 1.



**Graph.1 – The incidence of overweight in this study**

Distribution of overweight among boys and girls show a little prevalence in girls but with no statistical significance.

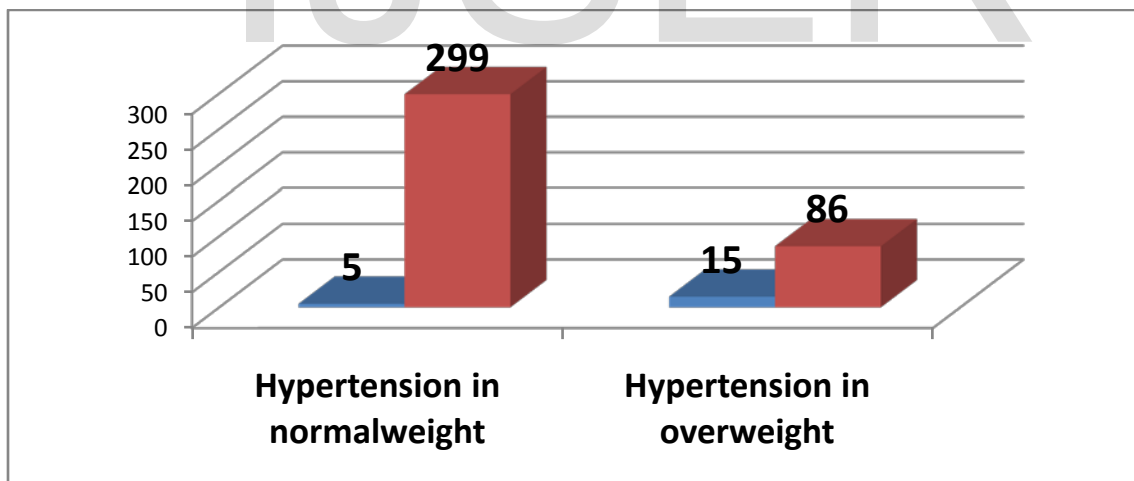
From 86 overweighted children 41 of them was boy and 45 girls. Graph. 2.



**Graph.2 - the ratio of boys and girls with overweight**

From totally 86 obese children, 48 of them or 55.8 % coming from obese parents and 38 others have parents with normal weight. This shows that obesity has a greater possibility to occur in children of obese parents .

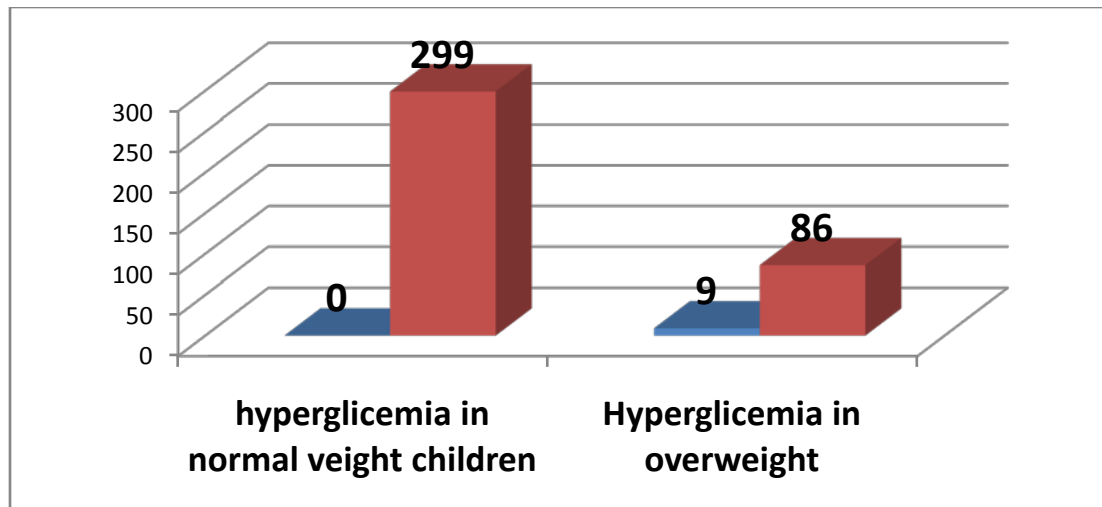
Prevalence of hypertension among obese children were 17.4 %, respectively in 15 of 86 obese children we have registered high blood pressure. Among normally weighed children – totally 299 only in five of them or 1.6 % is registered high level of arterial pressure.



**Graph. 3 – Incidence of hypertension in normal and overweight children**

According to our data results that overweight children were about ten time more likely to be hypertensive than those of normal weigh. The difference of hypertension among normal weight and obese children is of significant statistic value ( $p > 0.05$ ).

Among overweighed children the greater value of blood sugar concentration ( $> 100$  mg/dl) was registered in eight of them (9.3 %), while in the group of children with normal weight none had a high value of blood sugar. Graph. 4.



Graph.4 - Incidence of hyperglycemia in normal and overweight children

This is a indication that obese children are at higher risk of hyperglycemia than children with normal weight.

For all the children with elevated blood sugar ( $\geq 6.7$ mmol/l) urinalysis is done but no one had positive urine sugar and ketones.

## IV DISCUSION

Overweigh in children and adolescents is a growing health problem that is often overlooked by parents and physicians. During the last three decades, the prevalence of overweight and obesity in children has increased dramatically all over the world<sup>1,5,7</sup>. Now it is scientifically proven that overweight and obesity are strongly correlated with diabetes mellitus and primary hypertension in children.

A lot of investigations carried out among western populations show about the close connection of overweight with diabetes and hypertension<sup>2,3,4</sup>, and that the frequency and severity of this conditions are increase with the increase of BMI.

So the rise in childhood overweight has corresponded to an increasing proportion of type 2 diabetes among the peditric populations<sup>4,13, 14,15</sup>

At the same time the overweight children have been found to have a greater risk factors for cardiovascular disease (CVD), including high blood pressure<sup>6,8,9, 11, 12</sup>. Our study demonstrated statistically significant differences in the incidence of high blood sugar level and hypertension between the normal weight and

overweight children, similarly to other studies, which showed that overweight and obesity are consistent parameters associated with cardiovascular and diabetes risk.

## Conclusion

In our study overweight and obesity are positively correlated with hyperglycemia and high blood pressure, as in many studies undertaken in western countries. In our population the incidence of obese children is increasing, therefore, it is necessary to stimulate intensive measures to prevent obesity among children through promotion of physical exercise and sport, proper nutrition and a healthy life.

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